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OF

BANGLADESH

PART – I

VOLUME – III

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Forward

In Bangladesh, Unani system of Medicine has been used in medical practice for thousands of year and have played a significant role in maintaining human health. Many people of our country meet their health care needs by this system, due to the easy access and cost effectiveness in comparison to conventional medicine. To strengthen the system, the Government of Bangladesh has appointed 269 medical officers at different Upazila, District & Medical College Hospitals under the Alternative Medical Care (AMC) operation plan of DHGS.

Unani Pharmacopoeia is the basic requirement of Unani practitioners for preparation of Unani medicine in management of common diseases, so that they can provide rational and cost-effective treatment for all sorts of patients. I am very delighted to know that a Unani Pharmacopoeia (Part: Volume: V) is going to be published for Unani Practitioners. This will be a good resource for Traditional and Unani practitioners for the management of common ailments faced by the Unani physicians in Upazila, District & Medical College Hospitals and also in private sector. I cordially thank to all experts of Unani- medicine who were involved for the development of these Pharmacopoeia (Part: I, Volume: V) consisting of 50 monographs of single medicinal plants under HPNSP (2017-2022). I believe that their hard working and dedication will be fruitful when it will be available to the physicians. I request all physicians and the authority to follow the instructions inserted into the Pharmacopoeia for the betterment of Unani system, since it will play significant role deliberately in health care delivery system along mainstream treatment protocol.

Finally I would like to express my thanks to Line Director, Alternative Medical Care (AMC) & other officials who contributed immensely to the development of these Pharmacopoeias. Once again I would like to thank all DPM of Alternative Medical Care (AMC) who devoted their time to prepare, edit and publish these Pharmacopoeias.

I wish all the best.

Director General
Directorate General of Health Services
Mohakhali, Dhaka.

Preface

Unani System of Medicine had its own origin in the it and fourth centuries B.C. under the Patronage of Hippocrates in Greece (Unan). Later on t was introduced bybaynd Airsapblsayining ivethaen Iancdtian subcontinent. In our Country this system of medicine is practiced n role in preventing and curing human ailments. drugs and A major portion of our people is living in the rural areas. They gplriegfiebrletoaduvseers Ueneafnfie effects, Medicinal plants for their treatment due to its effectiveness, neavailability, inexpensiveness etc. Due to its negligible side effects and environment friendly nature, the developed countries are also emphasizing on the use of Unani natural drugs and Medicine plants for treatment of their people. Bangladesh Government has included Unani Medicine in National health & drug policy so that mass production of medicines in the Unani Pharmaceutical units can be produced on commercial scale. In view of the new trend in Unani Pharmaceutical field, Government of Bangladesh considered it expedient to utilize the existing Drug Act 1982 to control the Unani, Ayurvedic and Homeopathic drugs by amending the Act.

1to 99 is mentionable that Bangladesh National Formulary of Unani Medicine was first published in by the Bangladesh Board of Unani and Ayurvedic System of Medicine and after that it was edited in 2011. Many of the medicinal plants were included in that formulary for preparing the Unani medicine. So for ensuring the quality of Unani medicine, authentication of medicinal 1 or raw materials are very important. So department of Alternative Medical Care (AMC) under Part: I, Volume: V DGHS has taken steps to prepare the Unani Pharmacopoeia of Bangldesh,

Consisting of 50 monographs of single medicinal plants under HPNSP (2017-2022). I wish their effort & success.

Dr. Mohammad Azizur Rahman Siddque
Line Director,
Alternative Medical Care (AMC), DGHS,
Mohakhali, Dhaka.

PREFACE

The Unani drugs are symbol of life as they are drown from natural resources and most of the plants are generally free from adverse side effects. Drugs those are toxic in crude form are processed and detoxified in many ways before use. So it is considered free from side effects. Unani system of Medical Science prefers treatment through single drugs and their combination in raw form, rather than compound formulations. In the system, there is great emphasis on proper identifications of single drugs. Dioscorides (40-90 A.D.) is known in the field of Elmul Advia (Pharmacology) as its founder. He described about five hundred single drugs, later on, Galen, Abu Hanifa, Ibn Sina etc. contributed a lot to this field. Ibn Baitar (1176-1248 A.D.), the great scientist of Unani Medicine, compiled a book on pharmacology after extensive field survey and research described 1500 single drugs used in Unani medicine.

Now a days, the increasing popularity and acceptance of herbal drugs around the world is a major demand of a standard book. So, to ensure the quality and standard of herbs practicing in Unani system of medicine, the Government of Bangladesh has taken initiatives to establish a book 'The Unani Pharmacopeia of Bangladesh' to maintain the identification, purity, quality and safety through scientific and standard quality control parameters.

In this context the govt. of Bangladesh has already published I, II and III volumes of 'The Unani Pharmacopoeia of Bangladesh, Part-01' consisting of fifty monographs of single drugs in each volume. This present Volume-IV is a continuation of such efforts. It also comprises fifty monographs.

The features of this volume-IV is that, the monographs of single drugs selected here are basically indigenous, easily available, cost-effective, acquainted to the country people. These drugs are also has its own reference in the Unani texts and other books of herbal drugs published in the country and abroad. Among them only the scientifically evaluated and research based drugs are taken in to account.

The pictures, included with every monograph are contains high resolution/pixel so that, it can be viewed clearly. The Unani name of drugs is used as title name. Some of the drugs which are essential in medical service, but imported in our country are also included in the volumes due to its necessity.

Each monographs deals with necessary botanical descriptions which helps to identify it physically. Other than Unani name the botanical, English and Bengali name also mentioned here. To evaluate on scientific manner microscopic and macroscopic description also comprised here. The drug's parts of use also

maintain with title name but under the heading ‘Parts Used’, all parts of drugs which are using in the medical practice have been mentioned in the monographs.
Every monograph has information about phytoconstituents, research based pharmacological activities, temperament and required correctives, available proximal substitutes, side-effects or adverse effects or precautions (if any), TLC behavior etc.

In the efforts to compile pharmacopoeial monographs of Unani drugs the classical attributes of the drugs, according to Unani medical science like Mijzaj (Temperament), Aa’maal-e-Adviya (Pharmacological action), Mahall-e-Istemalat (Therapeutic use) and Meqdar-e-Khorak (Dose), Musleeh (Corrective), Badal (Proximal substitute), Muzir (Side-effects / adverse-effects) have been mentioned.

The Pharmacopoeial Team expect that the publication of the this Unani Pharmacopeia of Bangladesh, volume-IV, will also facilitate and assist the researchers and organizations to plan and expedite their research works, manufacturing of drugs or others related job.

Being limitation of facilities, opportunities and time frame, the Pharmacopoeia Team were unable to maintain the procedure require to prepare a pharmacopoeia, thus the Team followed the Unani pharmacopeia of India as main standard book. The Team also followed other Unani, herbal books and different research papers/ journals/articles etc.
The pharmacopeia Team put their enthusiastic efforts to complete it with the limitation of facilities to make it appropriate for the users.

As the first efforts of its kind in the field of Unani System of Medical Science, there is always scope for further improvement and we would like greatly welcome suggestion and advice from the experts in the field.

Professor Dr. Md. Ruhul Furkan Siddique
Team leader, Pharmacopoeia preparatory committee
And Professor, Department of Public Health and Informatics,
Jahangirnagar University.

Abbreviations and Acronyms

AMC	: Alternative Medical Care
cm.	: Centimeter
DGHS	: Directorate General of Health Services
ECNEC	: Executive Committee of the National Economic Council
gm.	: Gram
HNPSP	: Health, Nutrition and Population Sector Program
HNPSDP	: Health, Nutrition and Population Sector Development Program
kg.	: Kilogram
1	: Liter
m	: Meter
mm.	: Millimeter
mg.	: Milligram
ml.	: Milliliter
OP	: Operation Plan
PIP	: Programme Implementation Plan.
PM	: Program Manager
TLC	: Thin Layer Chromatography
v/v	: volume by volume
v/w	: volume by weight
w/w	: weight by weight
w/v	: weight by volume
u	: Weight by Volume
U	: Micron (0.001)
%	: Percentage

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ABRESHAM

(Silk cocoon)

Bombyx mori, the *domestic silkmoth*, is an insect from the moth family Bombycidae. It is the closest relative of *Bombyx* mandarina, the wild silkmoth. The *silkworm* is the larva or caterpillar of a silkmoth. It is an economically important insect, being a primary producer of silk.

Other names:

a. Botanical Name: *Bombyx mori*Linn

b. Family: Bombycidae

c. Bengali Name: Resham

d. English Name: Raw Silk Cocoon

Description

a. General:The drugs Abresham consists of silk cocoon spun by the larvae of *Bombyx mori* belongs to Family Bombycidae*;* the finest silk often known as mulberry silk comes from the larvae which feeds on the leaves of mulberry *Morus alba* Linn (Family Moraceae). The silk worm is the larvae or caterpillar of a moth in the family Bombycidae, an important producer of silk. The stage between the caterpillars to the chrysalis or pupal stage, it secrete around itself an oval cocoon about 2 to 5 cm long consisting of continuous thread up to 1200 m.

Fig: No: 16: Silk Cocoons

b. Macroscopic:Silk cocoon pale to dark yellow in color and up to 5 cm in length and 2 com in breadth with silk threads which are very fine, smooth and solid and light yellow in color. Silk is soft and smooth to touch and possess considerable strength and elasticity and hygroscopic. Silk thread consists of two silk or fibroin fibers cemented together by a layer of silk glue or sericin. Strands of semi liquid fluid fibroin produced by two glands in the insect flow into a common exit tube in the head, where they meet the secretion of silk glue produced by another pair of glands. The double with its coating of sericin emerges from a spinneret in the head of the worm, coagulates and hardens on contact with air and is spun into the cocoon. The double fiber in the cocoon is known as Bave and its single constitituent fibers are known as Brins.

It is easily soluble in Cuoxam, cold sulphuric acid 66%, strong hydrocholoric acid (s.g 1.16) and it dissolves with difficulty even on boiling with aqueous Caustic alkali solutions.

Parts used: Silk Cocoon

Habitat: Bangladesh and India

Chemical Constituents: Protein fibroin, glycine, alanine, serine, tyrosine and other amino acids.

Afa'al-e-Adviya (Pharmacological activities):

Larvae have been identified as a possible source of adipokinetic hormone (AKH), chymotrypsin inhibitors, ß- N -acetylglucosaminidase, sex pheromone bombykol, amino acids, etc., apart from their value as health food especially for cardiac and diabetic patients, bronchial asthma, primary trigeminal neuralgia, vocal nodules and polyps and in the treatment of facial palsy and pain. Pupae are a source of proteins, vitamin B 1, B 2 and E, diapause hormone, amino acids, etc., and form a part of antibacterial and antihistaminic preparations. Male moths are used to treat sterility. Paste chlorophyll, pectin, phytol, carotene and triacontanol, solanesol, etc., extracted from silkworm feces are used in the treatment of various diseases such as hepatitis, acute pancreatitis, chronic nephritis, stomach and gastric disorders, leukocytopenia, blood cholesterol, etc. Phytol is used in the preparation of vitamin E and K while carotene in vitamin A. Pelade obtained from reeled cocoons is read-ily digestible and forms a valuable ingredient of food. It reduces cholesterol and blood sugar. Chrysalises separated from pelade contain palmitic, stearic, oleic and linoleic acids and serve as a food additive and in pharmaceutical preparations.

The Unani system is based on four –characteristics Dam (Blood), Phlegn (Balgam), Safra (yellow bile), Sauda (blackbile). Extract of *Bombyx mori* cocoons a cardio protectant and expectorant of phlegm and as per unani hyperlipidemia occurs due to accumulation of excess of pathological phlegm aggravated phlegm in the blood, the action of the drug probably may be by removing the accumulation of excess of pathological phlegm form blood thereby bringing down Hyperlipidemia and preventing atherosclerosis.

Mizaj (Temperament): Hot 1 and Dry 1

Musleh (Corrective): Mixed with resham suta.

Badal (Proximal substitute): Incineration of pearl and Barge gaujaban**.**

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 1.5 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 1.0 percent, Appendix 2.2.4
Alcohol soluble extractives	: Not less than 0.5percent, Appendix 2.2.6.
Water soluble extract	: Not less than 5percent, Appendix 2.2.7.

Loss in weight on drying at 105^0C : Not more than 7 percent, Appendix 2.2.9.

TLC: Two grams extract of sample with 20 ml of chloroform and alcohol under reflux on a water bath for 30 min. Filter and concentrated to 5 ml and carry out the thin layer chromatography. Apply the chloroform extract on TLC plate. Develop the plate to a distance of 8.5 cm usingToluene: Ethyl acetate (5:15) as mobile phase. After development allow the plate to dry in air and examine under UV (366nm). It shows major spot at Rf 0.85 (sky blue). Dip the plate in Vanillin-Sulphuric acid reagent followed by heating the plate for 10 minutes at 110^0C observe under visible light. The plate shows major spot at Rf. 0.85 and 0.59 (violet). Appendix 2.2.10.

Apply the alcohol extract on TLC plate. Develop the plate to a distance of 8.5 cm usingToluene: Ethyl acetate (5:15) as mobile phase. After development allow the plate to dry

in air and examine under UV (366nm). It shows major spot at Rf 0.78 (light blue). Dip the plate in Vanillin-Sulphuric acid reagent followed by heating the plate for 10 minutes at 110^0C observe under visible light. The plate shows major spot at Rf. 0.78 (Dark blue).

Aa'a mal-e-Adviya (Pharmacological Action): Mufarreh (Exhilrant); Munaffise Balgham (Expectorant), Mulattif (Demulcent); Jali (Detergent); Muqabbe Hafeza (Memory tonic)

Muhall-e- Istamalat (Therapeutic uses): Khafqan (palpitation); Zofe-qlab (Weakness of the heart); Sual (cough); Zeequn Nafs (Asthma) and Nazla (catarrh)

Meqdar-e-Khorak (Dose): 3-5 gm

Side effects/ adverse effects: Headache and Dizziness

Important formulations: Dawaul Misk Mutadil Jawahirwali; Dawa-ul-Misk Motadil Sada, Khamira Abresham Arshadwala; Khamira Abresham sada; Khamira e Gaujaban Ambori; Khamira Gaujaban Sada; Majoon e Chobchini and Sarbate Abresham Sada.

A F T I M O ON

(Whole Plant)

"Aftimoon" plant is botanically known as *Cuscuta reflexa Roxb.* The plant is parasitic and grows on other plants.

Other names:

a) Botanical name: *Cuscuta reflexa Roxb.*

b) Family: Convolvulaceae, Cuscutaceae

c) Bengali name: Sworno lota, Akash Bel

d) English name: Dodder

Description:

a) General: The plants looks brownish-yellow in colour. The stems are wiry, slender and longitudinally furrowed. Its flowers pedicelled and cupped. Each cup has several teeth. Within the cup there is a corolla, the seeds are four, small, light brown, convex on one side and concave on the other and enclosed in a round capsule. The drug Aftimoon consists of dried stem and fruits of *Cuscuta rejlexa* Roxb. (Convolvulaceae),It occurs in Bangladesh, India, Nepal, Pakistan, Malaysia and Sri Lanka. Itsgrowing abundantly during rainy season on various host plants. The odour of Afitimoon (*Cuscuta reflexa Roxb.*) is aromatic and its taste is bitter and sharp.

b) Macroscopic: Dry, thread like stem pieces, brown in colour; about 0.8 mm in thickness; fruits capsule, small, globose or ovoid; seeds dark in colour, spherical to ellipsoidal, less than 1 mm in thickness, no specific odour or taste.

c) Microscopic: Transverse section shows outline of stem circular or slightly wavy; epidermal cells oblong, thin walled; cortex wide, parenchymatous; vascular system reduced to a central core of a few collateral, 4 or 5 bundles, around a central small pith region; xylem elements in radial rows in each bundle; phloem occurs in prominent patches on the outer part of each xylem strand.

Fruit: The pericarp of the fruit is thin and membranous, consisting of an outer layer of tangentially and narrowly oblong, thin walled parenchyma cells showing periclinal division at certain places; inner layer consists broad, barrel shaped cell with their inner tangential and radial walls very thick, the thickened portion appearing "U" shaped in cross section.

Seeds: Triangular or rectangular in Transverse section; testa thick and brittle; a thick echinate cuticle present followed by a narrow zone of epidermis consisting of radially elongated cells with thick walls; inner to epidermis a broad compact, thin walled radially elongated palisade like layer of cells present; mesophyll tissue shrunken, collapsed, forming membranous zone, adhering toinner layer at some places, but occasionally found detached; embryo minute, embedded in a mass of crushed or shrunk cotyledons.

Powder: Brown, polygonal and oblong cells present,; epidermal cells polygonal; thick walled xylem elements with spiral and annular thickenings present; length of vessel elements 90 to 110 |i; fragments of fibres with simple and bordered pits seen, length varying from 1000µto 1100 µ.

Parts used: Whole plant

Habitat:

It grows in Bangladesh, India, Nepal, Pakistan, Malaysia and Sri Lanka. Itsgrowing abundantly during rainy season on various host plants.

Phytoconstituents:

The drug contains important chemical constituents such as dulcitol, luteolin, quercetin and a glycoside, luteolin.

It consists of quercetin, resins and slightly bitter alkaloidal principle cuscutine, which is soluble in chloroform and ether. Cuscuta reflexa contains about 0.2% of cuscutin and cuscutalin, β-sitosterol. Cuscutin is a colouring matter and cuscutalin is a lactone. β-sitosterol is a flavonoid. C. reflexa seeds contain kaempferol and amarbelin. Stem contains luteolin, kaempferol & bergenin. It also contains coloured pigment amarbellin, wax as well as semidrying oil.

Af'aal-e-Adviya (Pharmacological Activities): Some of Af'aal-e-Adviya (Pharmacological activities) are describe here.

Effect onCardiovascular system: In a series of experiments, alcoholic extracts of his plant caused a fall in blood pressure on dog. This action was not blocked by atropine, merpyramine or propranolol, thus it could not be exerted through cholinergic, histaminergic or adrenergic mechanism27. An ethanolic extract of the stem of Cuscuta reflexa caused a dose-dependent decrease in arterial blood pressure and heart rate in pentothal-anaesthetized rats, and this effect was not blocked by atropine. Hypotensive and bradycardiac effects of Cuscuta reflex were found to be independent of cholinergic receptor stimulation or adrenergic blockage.

Antidiabetic effect: The methanol and aqueous extracts (200 and 400 mg/kg body wt) showed significant reduction in blood glucose during OGTT in diabetes rats at 3h. The treatment also resulted an improvement in body weights, decreased Hb1c and restored lipid

profile. Methanolic extracts of Cuscuta reflexa has significant antidiabetic effects and improves metabolic alterations.

Antioxidant activity: In vitro antioxidant activity of Cuscuta reflexa stem extract by estimating degree of non-enzymatic haemoglobin glycosylation was measured calorimetrically at 440 nm. Ethyl acetate fraction of ethanolic extract showed higher activity than other fractions32. Synthesized phytochelatins and carried out modulation of antioxidants in response to cadmium stress in Cuscuta reflexa. The effects of cadmium on growth, the antioxidative enzymes namely catalase peroxidase glutathione reductase, glutathione and phytochelatins were found in callus and seedling of Cuscuta reflexa.

Antipyretic activity: At the dose of 400mg/kg body weight the aqueous and ethanol extract reduced 79% and 83.8% respectively of the elevated rectal temperature as compared to reference drug Paracetamol (96.5%) after 6 hours of treatment. It appears that the antipyretic activity of Cuscuta reflexa may be due to inhibition of prostaglandin synthesis. Again the extracts contain flavonoids and saponins, the antipyretic potential of which has been reported.

Spasmolytic action: Aqueous and alcoholic extracts of Cuscuta reflexa stem have got a relaxant and spasmolytic action on small intestine of guinea pig and rabbit. Also, the extracts exhibited acetyl choline-like action.

Anti-HIV activity: The crude water extracts of Cuscuta reflexa exhibited anti- HIV activity that could be due to combinatory effects with compounds of different modes of acion.

Antitumor activity: Administration of Aqueous and ethanol extracts of Cuscuta reflexa whole plant at doses of 200 and 400 mg/kg body weight resulted in a significant ($p<0.05$) decrease in tumor volume and viable cell count but increased non-viable cell count and mean survival time, thereby increasing the life span of the tumorbearing mice. Restoration of hematological parameters – RBC, Hb, WBC, and lymphocyte count to normal levels in extract treated mice was also observed.

Anti-arthritic and nephroprotective effect: Antiarthritic activity of Aqueous and Methanol extracts of Cuscuta reflexa was evaluated in vivo using formaldehyde and turpentine oil-induced arthritis models and in vitro using formaldehyde and turpentine oil-induced arthritis models and in vitro using protein denaturation methods. AMECR at 600mg/kg significantly reduced paw edema and joint swelling with maximum inhibition of 71.22% at the 6th hour for turpentine oil and 76.74% on the 10th day for formaldehyde. Likewise in vitro results corroborate significant concentration dependent increase in % protection at 800 μg/mL against both bovine serum albumin (89.30%) and egg albumin (93.51%) denaturation. This

result shows that AMECR provides protection against arthritis and nephrotoxicity that might be due to the existence of phytoconstituents.

Anti-inflammatory activity: Alcoholic and aqueous extract of stem of Cuscuta reflexa were evaluated for their anti-inflammatory activity in carrageenan induced paw edema model in rats, and compared to the activity of the standard drug, Ibuprofen. These extracts were given orally at a concentration of 100, 200 and 400 mg/kg bd. Wt. before carrageenan injection. Both the extracts with medium and higher doses i.e. 200mg/kg and 400 mg/kg have reduced edema volume by 47.27%, 72.72% and 57.72%, 80.00% respectively at 5th h as compared to standard drug Ibuprofen 96.36%. Thus this study revealed that the selected extracts of Cuscuta reflexa exhibited a significant anti-inflammatory activity in carrageenan induced paw oedema model in rats.

Antimicrobial activity: Ethanolic whole plant extracts obtained from Cuscuta reflexa were screened against Gram positive (Bacillus subtilis and Staphylococcus aureus) and Gram negative (Escherichia coli and Salmonella typhi) bacteria to evaluate their antimicrobial activity. Of the four concentrations of plant extract tested (200 µg/mL, 300 µg/mL, 400 µg/mL or 500 µg/mL), 500 µg/mL elicited the greatest zones of bacterial inhibition across three of the bacteria. In contrast, the growth of Salmonella typhi was not halted regardless of extract concentration. Overall, although the greatest antimicrobial activity was demonstrated to be against E. coli at a concentration of 500 µg/mL (24.6±0.24), upon comparison to the other bacteria, both B. cereus and S. aureus reduced similar zones of inhibition upon comparison to their positive antibiotic control the ethanolic extract of Cuscuta reflexa contains a myriad of compounds such as alkaloids, carbohydrates, glycosides, flavonoids, tannins, phenolic compounds and steroids. The authors determined that it is the flavonoid, glycosides contained within the plant which are responsible for the inherent antimicrobial activity. This preliminary investigation suggests that the ethanolic extracts from Cuscuta reflexa do possess significant antimicrobial properties.

Hair growth activity: The petroleum ether and ethanolic extract of Cuscuta reflexa were given at the dose 250 mg/kg in male swiss albino rats. Cyclophosphamide (125 mg/kg) was used to induce alopecia. This study was shown to be capable of promoting follicular proliferation or preventing hair loss in cyclophosphamideinduced hair fall.

Mizaj (Temperament): Hot 2^{O}-Dry 2^{0}

Musleeh (Corrective): Zafran, Raughan-e-Badam, Samagh-e-Arabi,Sikanjabeen, Kasni

Badal (Proximal substitute): Turbud, Hasha.

Identity, purity and strength:

Foreign matter	-	Not more than 2 %,	Appendix 2.2.2
Total ash	-	Not more than 10%,	Appendix 2.2.3
Acid insoluble ash	-	Not more than 9 %,	Appendix 2.2.4
Alcohol soluble extractive	-	Not less than 9 %,	Appendix2.2.6
Water soluble extractive	-	Not less than 16 %,	Appendix 2.2.7

TLC behavior of chloroform extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Toluene : Ethyl Acetate (5:1.5)	Dipped in Vanillin sulphuric acid reagentand heated in air oven at105^0 for 10 minutes	7	0.14 0.20 0.31 0.47 0.53 0.67 0.82

Aa'maal-e-Adviya (Pharmacological Action):

Mushil Sauda, Mushil-e-Balgham, Musaffi-e-Dam, Muhallil-e-Warm, Mufatteh Sudad, Mudirr-e-Haiz, Mudirr-e-Baul, Muqavvi-e-Kulayyah, Dafe Humma.

Mahall-e-Istemalat (Therapeutic use):

Waram-e-Tehal, Malikholia, Kaboos, Junoon, Zof-e-Kabid, Waram-e-Kabid, Humma, Zof-e-Kulayyeh, Sul'aa

Meqdar-e-Khorak (Dose): 3-5 g

Side-effects / Adverse-effects: No significant side effects / Adverse-effects: have been observed.

Important formulations:

Itrifal Aftimoon, Itrifal Ghudadi, Itrifal Deedaan, Jawarish Shehryaran, Ma'joon-e-Najah, Ma'joon-e-Sana, Ma'joon-e-Dabeedul ward, Ma'joon-e-Chob Chini, Ma'joon-e-Talkh, Ma'joon-e-Ushba, Muffareh Mo'tadil, Mufarreh Kabir, Safuf Namak-e-Sulaimani, Sharbat-e-Aftimoon, Sharbat-e-Bazoori Har, Sharbat-e- Kasus, Sharbat-e-Mulayyin, Sharbat-e-Ahmad Shahi, Sharbat-e-Dinar

AJWAIN

(Fruit)

Trachyspermum ammi L. belonging to family Apiaceae is a highly valued medicinally important seed spice. The roots are diuretic in nature and the seeds possess excellent aphrodisiac properties. The seeds contain 2–4.4% brown colored oil known as ajwain oil. The main component of this oil is thymol, which is used in the treatment of gastro-intestinal ailments, lack of appetite and bronchial problems. The oil exhibits fungicidal antimicrobial and anti-aggregatory effects on humans.Ajwain is a traditional potential herb and is widely used for curing various diseases in humans and animals. The fruit possesses stimulant, antispasmodic and carminative properties. It is an important remedial agent for flatulence, atonic dyspepsia and diarrhea.The seed of ajwain is bitter, pungent and it acts as anthelmintic, carminative, laxative, and stomachic. It also cures abdominal tumors, abdominal pains and piles.Seeds contain an essential oil containing about 50% thymol which is a strong germicide, anti-spasmodic and fungicide.

Other names:

a. Botanical Name: *Trachycpermum ammi* (Linn) Sprague ex Turril Syn. *Carum copticum* Benth & Hook. F, *Ptychotis ajowan* DC

b. Family: Apiaceae

c. Bengali Name: Desi Jain

d. English Name: Bishop's weed

Description

a. General**:** The drug Ajwain consists of dried fruits of*Trachycpermum ammi* (Linn) Sprague ex Turril Syn. *Carum copticum* Benth & Hook. F, *Ptychotis ajowan* DC belongs to Family Apiaceae, an annual erect Herb, upto 90 cm tall, cultivated almost throughout India and Bangladesh uprooted and trashed for collecting the fruits.

Fig: No: 17: Ajwain

b. Macroscopic: Fruit consists of two mericarps, greyish brown, ovoid, compressed about 2 mm long and 1 mm wide with pale colored protuberances. Five ridges and 6 vittae in each mericarp, usually separate, 5 primary ridges pale in color. Odour characteristics, thymolic and taste-pungent.

c. Microscopic: Transverse section of fruit shows two hexagonal structures attached with each other by a carpophore, epicarp consists of a single layer of tangentially elongated tubular cells, externally covered with cuticle at some places having thick walled, unicellular trichomes as protuberances with serrate wall. Mesocarp consists of moderately thick walled, rectangular to polygonal tangentially elongated cells having some vascular bundles and vittae. Carphophore present as group of thick-walled radially elongated cells. Integument, barrel shaped of tangentially elongated cells. Endosperm consists of thin walled cells filled with oil globules and aluorone grains, embryo small and circular composed of polygonal thin walled cells.

d. Powder: Oily, greyish brown, under microscope, presence of oil globules and groups of endosperm cells-characterized.

Parts used: Fruit

Habitat: Egypt, Iraq, Iran, Afghanistan, Pakistan, India and West Bengal.

Chemical Constituents: Essential oil and fixed oil.

Afa'al-e-Adviya (Pharmacological activities):

Antibacterial Activity: Trachyspermum ammi (Ajwain) to kill the bacteria resistant to evenprevalent third generation antibiotics and multi-drug resistant (mdr)microbial pathogens and thus useful as a plant based fourth genera-tion herbal antibiotic formulation.

Digestive stimulant activity: The addition of T. ammi to the diet reduced food transit time from 780 minutes (control) to 554 mins, a 29% reduction ($p<0.05$). Thedietary spices that markedly reduced the food transit time also en-hanced the activity of digestive enzymes and/or caused a highersecretion of bile acids. They suggested that the reduction in foodtransit time could probably be attributed to an acceleration of theoverall digestive process as a result of increased availability andpotency of digestive secretions.

Abortifacient activity:.The T. ammi seed aqueous extract dosed at 175 mg/kg in rats(n=5) was 62.5% effective as an abortifacient. In cases where preg-nancy was continued in spite of herbal drug administration, fetuses showed various skeletal defects and several other visceral defects;they expressed concern at the remarkable potential of the putativeabortifacient herbal drugs to affect foetuses adversely, and the largenumber of people in rural areas of India who continue to be exposedto these plants without being fully aware of the potential side effects

Mizaj (Temperament): Hot 3^0& Dry 3^0

Musleh (Corrective): Dhonia, watermelon and sour substances**.**

Badal (Proximal substitute): Kalojira

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 9 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 0.2 percent, Appendix 2.2.4.
Alcohol soluble Ash	: Not less than 2 percent, Appendix 2.2.6.
Water soluble extract	: Not less than 13 percent, Appendix 2.2.7.
Volatile Oil	: Not less than 2 percent, Appendix 2.2.8.

TLC: TLC of the petroleum ether (60-80^{0}C) extract on silica gel "G plate" using Toluene: Ethyl acetate (9:1) On spraying with 5% Sulphuric acid in ethyl alcohol shows five spots at Rf. 0.28, 0.38, 0.43, 0.48 and 0.72. Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Mushtahi (Appetizer); Kasire –Riyah (Carminative); Dafe Tashaunnuj (Anti spasmodic); Dafe Taffun (Antiseptic).

Muhall-e- Istamalat (Therapeutic uses): Nafkh-e-shikam (Flatulence in the stomach); Wajaul Meda (Gastric Pain), Zofe ishteha (Anorexia); Qulanj (Colic); Shaheeqa (Pertussis); Is-hal (Diarrhoea); Ihtenaqur Rahem (Hysteria) and Haiza (Cholera).

Meqdar-e-Khorak (Dose):3-6 gm of the drug in powder form

Side effects/ adverse effects: Excess use may be harmful for hot temperamental person and Headache.

Important formulations: Arq-Ajwain; Majoon Nankha and Majun e Zabeeb.Qurse Muhazzil.

AJWAIN KHURASANI

(Seed)

Ajwain Khurasani is originated in Eurasia, and is now globally distributedas a plant grown mainly for pharmaceutical purposes. It's seed is used in traditional herbal medicine for ailments of the bones, rheumatism, toothache, asthma, cough, nervous diseases, and stomach pain. It also be used as analgesic, sedative, and narcotic.

Other Names:

a. Botanical Name : *Hyoscyamus niger* Linn

b. Family : Solananceae

c. Bengali Name : Khorasani Joen

d. English Name : Henben

Description:

a. General Description:The Unani drug Ajawain khurasani consists of the seed of *Hyoscyamus niger* Linn belongs to family -solananceae, an annual or biennial herb, native to the Mediterranean region and temperate Asia found in WesternHimalayas at an attitude of 1600 to 4000 meter. It is an imported drug to Bangladesh.

Fig: No: 1: Ajwain Khorasani plant and Seed

b.Macroscopic: Seeds irregularly reniform or sub-quadrate, slightly over 1 mm in size, dark grey, surface concave, odor pleasantly aromatic, taste-bitter, mucilaginous and pungent aromatic.

c.Microscopic: Transverse section of seed show the presence of thick cuticle, testa with two layers, outer one with a row of osteoscleride size ranging from 50 to 80 micron, inner one with crusted parenchyma, endosperm cells thin walled containing oil globules, embryo coiled and starch absent.

d. Powder: Dark brown aromatic smell, bitter mucilaginous taste and an oily texture; a number of flask- shaped or dumb-bell shaped osteosclereids seen; fragments of testa in surface view, showing cells with sinuous walls, powder when treated with Sudan IV and mounted in glycerin shows the presence of oil globules which turn orange red; powder cleared with dilute nitric acid shows surface view sculpturing on testa.

Parts used: Seed

Habitat: Iran, Central Asia, Himalay, Kashmir and Afganisthan

Chemical Constituents: Tropane alkaloids hyoscyamine (its racemic mixture and atropine), hyoscine and seopolamine.

Afa'al-e-Adviya (Pharmacological activities):

Modern pharmacological experiments showed that *H. niger* had the analgesic, anti-inflammatory, antipyretic, anticonvulsant, spasmolytic, antidiarrhoeal, antisecretory, bronchodilatory, urinary bladder relaxant, hypotensive, cardiosuppressant, vasodilator and antitumor activities.

Hyoscyamine is an antagonist of muscarinic acetylcholine receptors (antimuscarinic). It blocks theaction of acetylcholine at parasympathetic sites in sweat glands, salivary glands, stomach secretions, heart muscle, sinoatrial node, smooth muscle in the gastrointestinal tract, and the central nervous system.

Mizaj (Temperament): Cold $3^{o}$and Dry 3^{o}

Musleh (Corrective): Honey, Anisun, Dhonia and Sour substances**.**

Badal (Proximal substitute): Desi Joen, opium and Khaskhas Siah.

Identity, Purity and Strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 4 percent, Appendix 2.2.3
Acid insoluble Ash	: Not more than 1 percent, Appendix 2.2.4
Alcohol soluble extractives	: Not less than 16 percent, Appendix 2.2.6
Water soluble extractives	: Not less than 10 percent, Appendix 2.2.27

Thin Layer Chromatography (TLC):

TLC of the methanolic extract on silica gel "G plate (0.2 mm thick) using toluene : ethyl acetate: diethyl amine (70:20:10) shows under UV (366 mm) one fluorescent spot at Rf 0.49 (blue); After spraying with anisaldehyde-sulphuric acid reagent a heating the plate at 105 degree C for ten minutes ; spot appear at Rf 0.09 (Brown), 0.49 (brown). 0. 69 (greenish brown). After spraying with modified Dragendroffs reagent spots appear at Rf 0.90, 0.77, 0.61, 0.23 and 0.10. Appendix 2.2.10

Aa'a mal-e-Adviya (Pharmacological Action):Mukhaddir, Musakkin, Munabbim, Habis.

Muhall-e- Istamalat (Therapeutic uses) : Sual Yabis, Wajaul Mafasil; Irqun Nesa, Niqris and Junun sehar.

Meqdare Khorak (Dose): 0.5-1.0 gm

Side effects: Excess use may cause headache, hallucination for hot temperamental person.

Important formulations: Barshasha; Tiriake Nazla; Qurse Mulayin and Habbe Jadwar

ANAR

(Fresh seed)

The *pomegranate (Punica granatum*) is a fruit-bearing deciduous shrub in the family Lythraceae, subfamily Punicoideae,that grows between 5 and 10 m (16 and 33 ft) tall. The fruit is typically in season in the Northern Hemisphere from September to February, and in the Southern Hemisphere from March to May.

Others names:

a. Botanical Name: *Punica granatum* Linn

b. Family: Punicaceae

c. Bengali Name: Dalim

d. English Name: Pomegranate

Description

a. General:The drug Anar consists of fresh seeds of *Punica granatum* Linn belongs to family punicaceae, a large deciduous shrub or a small tree; found growing wild in the warm valley, outer hills of Himalayas, between 900-1800 m and cultivated in many parts of the country.

Fig: No 18 : Fresh Seed of Pomegranate

b. Macroscopic**:** Seeds brown, angular, wedge-shaped, 0.5 -0.6 cm long, 0.1-0.2 cm wide, taste Sweetish –sour.

c. Microscopic**:** Seed shows testa consisting of thin-walled, parenchymatous cells followed by stony tegmen consisting of lignified, round, oval, triangular and rectangular ; thick-walled stone cells having narrow as well as wide lumen. Beneath this, reddish –brown pigmented layer is present, endosperm absent, cotyledons coiled, consisting of oval to polygonal, thin walled parenchymatous cells, containing a few oil globules. Starch grains present in testa are round to oval, simple measuring 3-17 mm.

d. Powder**:** Reddish-brown; shows stone cells, oil globules and few are simple round to oval starch grains measuring 3-17 mm in diameter.

Parts used: Fresh seed

Habitat: Bangladesh, Africa, Iran, Afganisthan and India

Chemical Constituents: Sugars, Vitamin C, sitosterol, Ursolic acid, Protein, Fat and mineral matters, Nicotinic acid, pectin, Riboflabin, Thiamine, Delphinidin diglycoside, Aspartic, Citric, Ellagic, Gallic and Malic acids, Glutamine, Isoquercetin, Estone and Punicic acid.

Afa'al-e-Adviya (Pharmacological activities):

Antimicrobial activity: Burapadaja *et al*., reported that pomegranate fruit peel compound punicalagin haveantimicrobial activity against *S. aureus* and *P. aeruginosa.*

According to Perez *et al*., pericarp extract of *Punica granatum* possess strong antibacterial activity against the multiple resistance of *Salmonella typhi*. Boiling water extracts of 132 plants commonly used in Argentine folk medicine, were screened for antibacterial activity against *Salmonella typhi* using the agar-well diffusion method. A reference concentration-response curve for ampicillin was used to estimate the apparent activity of the samples, and they found good result in case of pericarp extract of *Punica granatum*.

Voravuthikunchai *et al*., used aqueous and ethanolic extracts of *Punica granatum* to test their antibacterial activity against different strains of *Escherichia coli*. Inhibition of growth was primarily tested by the paper disc agar diffusion method. Among the medicinal plants tested by dilution method in petri dishes with millipore filter, aqueous extract of *Punica granatum* was highly effective against *Escherichia coli* O157:H7 with the best MIC (minimum inhibitory concentration) and MBC(minimal bactericidal Concentration) values of 0.09, 0.78, and 0.19, 0.39 mg/ml, respectively.

According to Vasconcelos *et al*., *Punica granatum* extract can be used to control the adherence of different microorganisms in the oral cavity. They used various extract of *Punica*

granatum against the streptococci strains, *S. mutans*, and *S. mitis* and *C. albicans* and the found good results against selected bacteria.

In a separate study, it was found that hydroalcoholic extract (HAE) from *Punica granatum* is very effective against dental plaque microorganisms (In vivo) and the number of colony forming units per milliliter (CFU/ml) was reduced by 84% as compared to the control group (11% decrease). These results indicated that the HAE may be a possible alternative for the treatment of dental plaque.

In vitro study by Neurath *et al*., indicated that an anti- HIV-1 microbiocide could potentially be made from *Punica granatum* that could be used as a topica microbiocide for HIV prevention .

In a study by *Dahham et al*., the antibacterial and antifungal activities of pomegranate peel extract (rind), seed extract, juice and whole fruit on the selected bacteria and fungi. The peel extract showed the highest antimicrobial activity compared to other extracts. Among the selected bacterial and fungal cultures, the highest antibacterial activity was recorded against *Staphylococcus aureus* and amongst the fungi the highest activity was recorded against *Aspergillus niger.*

Healing Activity: Gallic acid and catechin are the major components of *Punica granatum* which are responsible for the healing activity.

According to Murthy *et al*., The methanolic extract of dried pomegranate *(Punica granatum*) peels showed the presence of a high content of phenolic compounds (44.0%) along with other constituents. This extract was formulated as a 10% (w/w) water-soluble gel and was studied for its wound healing property against an excision wound on the skin of Wistar rats. The group of rats that received 5.0% gel showed complete healing after 10 days, whereas in rats treated with 2.5% gel, healing was observed on day 12, in contrast to the positive control animals receiving the blank gel, which took 16-18 days for complete healing

Braga and his colleagues evaluated the interaction between *Punica granatum* (pomegranate) methanolic extract (PGME) and antibiotics against 30 clinical isolates of methicillin-resistant *Staphylococcus aureus*(MRSA) and methicillin-sensitive *Staphylococcus aureus* (MSSA). Susceptibility testing of the isolates to PGME and antibiotics was performed by the broth dilution method.

Synergistic activity was detected between PGME and the five tested antibiotics i.e. chloramphenicol, gentamicin, ampicillin, tetracycline, and oxacillin. For some isolates, PGME did not interfere with the action of any of the antibiotics tested. The bactericidal activity of PGME (0.1 x MIC) in combination with ampicillin (0.5 x MIC) was assessed

using chosen isolates by time-kill assays, and that confirmed the synergic activity. Using this combination, cell viability was reduced by 99.9% and 72.5% in MSSA and MRSA populations, respectively. PGME increased the post-antibiotic effect (PAE) of ampicillin from 3 to 7 h. In addition, PGME demonstrated the potential to either inhibit the efflux pump NorA or to enhance the influx of the drug. The *in vitro* variant colonies of *S. aureus* resistant to PGME were low and they did not survive. In conclusion, PGME dramatically enhanced the activity of all antibiotics tested, and thus, offers an alternative for the extension of the useful lifetime of these antibiotics

Anti-inflammatory Activity: The major ingredient of pomegranate fatty acids, punicic acid, is well known anti-inflammatory compound which inhibits the development of inflammation by suppressing the biosynthesis of prostaglandin.

The anti-inflammatory compounds were mainly obtained from the seeds. The results exhibited polyphenols and fatty acids were the major anti-inflammatory constituents. The extract from the cold pressed seed oil of pomegranate mainly comprised of polyphenols and fatty acids which showed 31-44% inhibition of sheep cyclooxygenase and 69-81% inhibition of soybean lipooxygenase, whereas the extract from fermented juice showed 21-30% inhibition of soy bean lipoxygenase.

According to Van De Walle *et al*., the polyphenols in cold pressed seed oil were reported by another research group to suppress inflammatory cell signaling in colon cancer cells [30]. Pomegranate extract exhibited anti-inflammatory activity via inhibition of NF-κB (nuclear factor kappa-B) activity and Erk1/2 activation and decreased NO (nitric Oxide) and PGE_2 synthesis in human intestinal Caco-2 cells. In addition, ellagic acid was capable of decreasing NF-κB activation through a mechanism independent of Iκ-Bα phosphorylation

Anti-diabetic Activity: The flowers can significantly lower the blood glucose level in case of type II diabetes with different possible mechanisms including enhancement of mRNA expression, improvement of insulin receptor sensitivity, increment of peripheral glucose utilization, etc.

According to Bagri *et al*., the oral administeration of aqueous extract of pomegranate flowers at doses of 250 and 500 mg/kg for 21 days resulted in a significant reduction in fasting blood glucose, TC(total cholesterol)., TG (Triglycerides), LDL-C (low-density-lipoprotein cholesterol), VLDL-C (very-low-density lipoprotein cholesterol) and tissue LPO (lipid peroxidation) level coupled with elevation of HDL-C (High- density- lipoprotein cholesterol), GSH (glutathione) content and antioxidant enzymes in comparison with diabetic control group.

Results suggested that the aqueous extract of flowers can be used as dietary supplement in treatment and prevention of chronic diseases characterized by hetrogenous lipoprotein profile, aggravated antioxidant status and impaired glucose metabolism [32]. The mechanisms for such effects are unknown, though recent researches suggest that pomegranate flowers and juice may prevent diabetic sequelae via peroxisome proliferator-activated receptor-gamma binding and nitric oxide production.

Anti cancer Activity: The juice, peel, and seed oil of Pomegranate have been found to have anti-cancer properties that inhibit proliferation, cell cycle, and angiogenesis

Amin *et al*.,reported that pomegranate fruit, pomegranate juice, seed and seed oil are effective in prostate, breast, skin, colon, lung, oral and leukaemia cancers due to its antioxidant and antiproliferation (growth inhibition, cell cycle disruption and apoptosis).

Mizaj (Temperament): Anar Shireen –Cold and Moist (1 degree) ; Anar Tursh –Cold and Dry.

Musleh (Corrective): Sour Dalim; Adar murabba and Rumi mustagi.

Badal (Proximal substitute): One dalim to another**.**

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 4 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 0.5 percent, Appendix 2.2.4.
Alcohol soluble Ash	: Not less than 20percent, Appendix 2.2.6.
Water soluble extractive	: Not less than 35percent, Appendix 2.2.7.

TLC: TLC of alcoholic extract of the drug onsilica gel “G plate” using Chloroform: Ethyl acetate: Formic Acid (5:4:1) v/v three spots at Rf 0.62, 0.87 (both grey) and 0.97 (pink) are seen in visible light.Under UV (366 nm) four fluorescent zones are visible at Rf. 0.12 (sky blue), 0.45 (sky blue), 0.62 (blue) and 0.87 (blue). On the exposure to iodine vapour three spots appear at Rf 0.62, 0.87 and 0.97(all yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate for 10 minutes at 110^0C shows three spots at Rf. 0.62, 0.87 (both violet) and 0.97 (greyish blue). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Anar Shireen-Muqabbie-Qalb (Cardiac Tonic), Muqabbie-Jigar (Liver tonic), Musakkin Atash (Allays thirst), Muwwalid-e-Dam (Haematogenic), Mudire Baul (Diuretic). **Anar Tursh-** Qabiz (Constipation), Muqabbie Qalb (Cardiac Tonic), Muqabbie-Jigar (Liver tonic); Musakkine Safra (Bile neutralizer); Mudire Baul (Diuretics) and Qat-e Safra (Antibilious).

Muhall-e- Istamalat (Therapeutic uses):Anar Shireen-Atash-e-Mufrit (Polydipsia), Zofe Am (General weakness), Faqruddam (Anaemia);**Anar Tursh-** Sozish-e sadr (Burning in the chest); Ghasiyan (Nausea), Qai (vomiting), Yarqan (Jaundice) and Atash-e-Mufrit (Polydipsia)

Meqdar-e-Khorak (Dose): Juice of Anar-25-60 ml/3-5 gm

Side effects/ adverse effects: Dyspepsia.

Important formulations: Sharbate Anar; Jawarishe Anarain and Jawarish-e-Pudina. Habbe Shahqa. Capsule Punica, Tablet Punica and Syrup Punica.

ANGOOR

(Fruit)

Vitis vinifera, the common grape vine, is a species of *Vitis*, native to the Mediterranean region, Central Europe, and southwestern Asia, from Morocco and Portugal north to southern Germany and east to northern Iran. There are currently between 5,000 and 10,000 varieties of *Vitis vinifera* grapes though only a few are of commercial significance for wine and table grape productionIt is a liana growing to 32 m (35 yd) in length, with flaky bark. The leaves are alternate, palmately lobed, 5–20 cm (2.0–7.9 in) long and broad. The fruit is a berry, known as a grape; in the wild species it is 6 mm (0.24 in) diameter and ripens dark purple to blackish with a pale wax bloom; in cultivated plants it is usually much larger, up to 3 cm (1.2 in) long, and can be green, red, or purple (black). The species typically occurs in humid forests and streamsides.

Other names:

a. Botanical Name: *Vitis vinifera* Linn

b. Family: Vitaceae

c. Bengali Name: Angoor/Maneka

d. English Name: Dry Grapes

Description

a. General:The drug Angoor consists of dried mature fruits of*Vitis vinifera* Linn belongs to Family-vitaceae, a deciduous climber, mostly cultivated in north western India in Punjab, Himachal Pradesh and Kashmir for their use as desert fruit. However, the dried fruit, known in trade as “Raisins” are mostly imported into India, from the Middle East and Southern European Countries.

Fig:No 19: Angoor (Fruit)

b. Macroscopic:Fruit a berry, sticky and pulpy, dark brown to black; oblong or oval, sometimes spherical; 1.5-2.5 cm long and 0.5-1.5 cm wide; Outer skin irregularly wrinkled forming ridges and furrows; usually contain 1-4 seeds. Seeds 4-7 mm long, ovoid rounded to triangular or simply ovoid, brown to black. Odor –sweetish and pleasant; taste-sweet.

c. Microscopic**:**A single layered epidermis cells filled with reddish brown, contents, mesocarp pulpy, made up of thin-walled, irregular cells containing prismatic crystals of calcium oxalate, measuring 13.75-41 Iin diameter. Some fibro-vascular bundles also present in this region. Seeds composed of testa and endosperm. Testa composed of thick-walled yellowish cells; endosperm composed of angular parenchymatous cells containing oil globules and cluster crystals of calcium oxalate measuring 11-16 mm diameter.

Parts used: Fruit

Habitat: Mediterranean region, Central Europe, and southwestern Asia, from Morocco, Portugal north to southern Germany and east to northern Iran.

Chemical Constituents: Malic, Tartaric & Oxalic Acids, Carbohydrates and Tannins.

Afa'al-e-Adviya (Pharmacological activities):

Antioxidant activities: The aqueous extracts of V. vinifera L. tendrils have the potential to enhance the antioxidant capacity of human keratinocytes (NCTC 2544). Lyophilized red grape juice, at doses up to 0.01 μg, demonstrated cardioprotective effects against doxorubicin

induced toxicity in cardiac-derived H9c2 myocytes. In contrast, at doses of 0.01 μg to 0.05 μg, it enhanced oxidative stress in cardiac cells, probably because of pro-oxidant effects of the juice, as indicated mainly by the increase in reactive nitrogen species and antioxidant enzyme levels (Tenore et al., 2012). These findings should be considered when taking into account the recommended daily intake of polyphenols for achieving an antioxidant effect. In addition, an inverse relationship was found between melatonin and malondialdehyde (MDA) levels in the fruit of V. vinifera cv. Malbec, which suggested that melatonin is an antioxidant present in grapes (Boccalandro et al., 2011). On the other hand, a polyphenol-rich extract of grape pomace has shown dual effects both in vitro and in vivo. In vitro, the extract scavenged free radicals and inhibited DNA damage induced by peroxyl and hydroxyl radicals, but in vivo, it induced oxidative stress by increasing the protein carbonyl groups in erythrocytes and heart cells, increasing plasma thiobarbituric acid reactive substances, and decreasing the concentration of glutathione in the liver (Veskoukis et al., 2012). It is obvious that grape pomace extract acts differently in in vitro studies when compared to in vivo studies. If this is the case, then the findings of both in vivo and in vitro studies are not the same. A further study suggested that depending on the extraction methods or grape varieties, grape pomace extracts have antioxidant or pro-oxidant activity (Cotoras et al., 2014). In a recent study of 24 V. vinifera grape cultivars, it was determined that there is a direct relationship between total phenolic compounds and flavonoids and antioxidant activity (Liang et al., 2014).

Antibacterial, antiviral and antifungal activity: Some antiviral and anti-encephalitozoon activities of resveratrol and grapes were mentioned (Yadav et al., 2009). Resveratrol has been shown to exhibit antiviral effects against polyomavirus (Berardi et al., 2009). The hot water extract of grape skin (100 mg/mL) has shown anti-influenza activity in Madine–Darby Canine Kidney (MDCK) cells (Bekhit Ael-D et al., 2011). Procyanidin, an active compound of V. vinifera and some herbs, showed anti-influenza A activity and could inhibit the replication of this virus at several stages of life cycle (Dai et al., 2012). Two dimethoxy-resveratrol derivatives (3,4′-dimethoxy-resveratrol and 3,5-dimethoxyresveratrol) displayed interesting antifungal activities with minimum inhibitory concentration (MIC) values of 28–37 μg/mL against Candida species (Houillé et al., 2014). The ethanolic extract of V. vinifera L. tendrils has shown reasonable antifungal activities against Fusarium species with MIC values of 250–300 ppm. It seems that the high amounts of polyphenols in this plant play a major role in the observed antifungal effects (Fraternale et al., 2015). Preincubation of a gastric cell line with resveratrol (75 μM and 100 μM, 72 h) inhibited the secretion of IL-8 by

Helicobacter pylori-infected cells. Pretreatment with resveratrol (1–100 μM) suppressed H. pylori-induced reactive oxygen species (ROS) generation

Grape seed extract in particular has been reported to possess a broad spectrum of pharmacological and therapeutic effects such as antioxidative, anti-inflammatory, and antimicrobial activities, as well as having cardioprotective, hepatoprotective, and neuroprotective effects.

Mizaj (Temperament): Hot and Moist

Musleh (Corrective): Unknown**.**

Badal (Proximal substitute): White grapes can be substituted by black grapes.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 3 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 0.2 percent, Appendix 2.2.4.
Alcohol soluble Ash	: Not less than 25percent, Appendix 2.2.6
Water soluble extractive	: Not less than 70percent, Appendix 2.2.7.
Loss on drying	: Not more than 15percent, Appendix 2.2.9.

TLC: TLC of alcoholic extract on silica gel "G plate" using n-Butanol: Acetic Acid:Water (4:1:5) shows under UV (366 nm) a fluorescent zones at Rf 0.29 (blue). On the exposure to iodine vapour four spots appear at Rf 0.08, 0.29, 0.69 and 0.85(all yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate for 10 minutes at 110^0C shows three spots at Rf. 0.08(black), 0.29(black) and 0.98 (violet). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Mughazzi (Nutrients); Muwwalid e dam (Haematogenic); Mubhi (Adipogenous); Muqabbie-Badan (General tonic); Musakkin e Atash (Allay's thirst) and Muliyan (laxative).

Muhall-e- Istamalat (Therapeutic uses): Zofe Dam (General Weakness); Atash e Mufrit (Polydipsia); Faqrud-Dam (Anaemia); Humma e Muzmina (Chronic Fever) and Qabz (Constipation).

Meqdar-e-Khorak (Dose):125-250 gm

Side effects/ adverse effects: Gastro intestinal disturbances.

Important formulations: Sharbat-e-Angoor.Capsule Grape Seed; Tablet Grape Seed

ARUSA

(Leaf)

Adhatoda vasica belonging to family Acanthaceae, commonly known as Adosa, is found many regions of India and throughout the world, with a multitude of uses in traditional systems of medicine.

Other names:

a. Botanical Name: *Adhatoda vasica*

b. Family: Acanthaceae

c. Bengali Name: Basak

d. English Name: Vasaka

Description

a. General:The drug arusa consist of fresh dried mature leaves of *Adhatoda vasica* Nees [Fam. Acanthaceae], a sub-herbaceous bush 'found throughout the year in plains and sub-Himalayan tracts in India; ascending up to 1200 m. It flowers during February –March and also at the end of rainy season. Leaves stripped off from older stems and dried in sheds.

Fig: No: 20: Arusa (Leaf)

b. Macroscopic**:** Leaves 10-30 cm long and 3-10 cm broad, lanceolate to ovate-lanceolate, slightly acuminate, base tapering, petiolate, petioles, 2-8 cm long, estipulate, glabrescent, 8-

10 pairs of lateral vein bearing few hairs. Dried leaves dull brown above, light greyish brown below, odor characteristics and taste-bitter.

c. Microscopic**:**Transverse section of the leaves shows, dorsiventral surface with 2 layers of palisade cells. Insurface view, epidermal cells sinuous with anomocytic ; stomata on both surfaces; more numerous on the lower, clothing trichomes few, 1-3 rarely up to 5 celled, thin walled, uniseriate, upto 500i` and glandular trichomes with unicellular stak and 4 celled head measuring, 25-36 i` in diameter. In surface view, cystoliths in mesophyll layers elongated and cigar shaped, acicular and prismatic forms of calcium oxalate crystals present in mesophyll.

Parts used: Leaf

Habitat: Bangladesh and India

Chemical Constituents: Alkaloids and essential oil

Afa'al-e-Adviya (Pharmacological activities):

Anti-asthmatic and bronchodilator activity: Adhatoda has been used in traditional medicine to treat respiratory disorders. Both vasicine and vasicinone the primary alkaloid constituents of Adhatoda are well established as therapeutical respiratory agents. Extracts of Adhatoda's leaves and roots are useful in treating bronchitis, and other lung and bronchiole disorders, as well as common coughs and colds. A decoction of the leaves of Adhatoda has a soothing effect on irritation in the throat, and acts as an expectorant to loosen phlegm in the respiratory passages. To evaluate the antitussive activities of Adhatoda extract in anesthetized guinea pigs and rabbits and in unanesthetized guinea pigs showed the plant to have a good antitussive activity. Recent investigations using vasicine showed bronchodilatory activity both in vitro and in vivo.

Wound healing activity: For the purposes of the study, wounds were created along the ~ 90 ~ International Journal of Herbal Medicine vertebral columns of buffalo calves, and alcoholic and chloroform extracts of Adhatoda in a powdered form were applied. As compared to control animals, the calves treated with Adhatoda vasica showed significantly improved healing. Vasica improved breaking strength, tensile strength, absorption and extensibility in the wound repair tissue. In addition, the levels of elastin, collagen, hydroxyproline, hexosamine and zinc were greatly increased in the animals treated with Adhatoda. The alcoholic extract of the herb was found to be the most effective.

Anti-ulcer activity: Adhatoda vasica was studied for its anti-ulcerogenic activity against ulcers induced by ethanol, pylorus, and aspirin. Adhatoda leaf powder showed a considerable degree of anti-ulcer activity in experimental rats when compared with controls. The highest degree of activity was observed in the ethanol-induced ulceration model. These results suggest that in addition to its classically established pharmacological activities, Adhatoda vasica has immense potential as an anti-ulcer agent. Further research showed that a syrup of Adhatoda improved symptoms of dyspepsia.

Cholagogue activity: In laboratory experiments on cats and dogs, Adhatoda vasica was found to increase bile activity when the animals were given an intravenous dose of 5 mg/kg. In dogs, the amount of excreted bile increased by 40-100%. The animals also showed an increase in bilirubin excretion.

Anti-allergy activity: The extract containing the alkaloid vascinol and 20% vasicine inhibited ovalbumin-induced allergic reactions by about 37% at a concentration of 5 mg. Vasicinone has been shown to be a potent anti-allergen in tests on mice, rats and guinea pigs.

Anti-tubercular activity: A chemical constituent of Adhatoda alkaloids, vasicine, produces bromhexine and ambroxol – two widely-used mucolytics. Both of these chemicals have a pH-dependent growth inhibitory effect on Mycobacterium tuberculosis. Indirect effects of Adhatoda on tuberculosis include increased lysozyme and rifampicin levels in bronchial secretions, lung tissue and sputum, suggesting that it may play an important adjunctive role in the treatment of tuberculosis.

Abortifacient and uterotonic activity: Adhatoda vasica has abortifacient and uterotonic properties, making it useful for inducing abortion and for stimulating uterine contractions in order to speed childbirth. Studies on human subjects have shown that the alkaloid vasicine has significant uterotonic activity. This action appears to be influenced by the presence or absence of certain estrogens. In research on the activity of vasicine in stimulating uterine contractions, human myometrial strips taken from the uterusi of both pregnant and non-pregnant women were treated with Adhatoda. The herb was found to induce uterine contractions, with effectiveness similar to the drug oxytocin. During the research period, the anti-reproductive properties of Adhatoda vasica were anecdotally confirmed by local women. Animal studies have also demonstrated vasica's abortifacient properties. Aqueous or 90% ethanol plant extracts were given orally to test rats and guinea pigs for 10 days after insemination. Leaf extracts of Adhatoda vasica were 100% abortive at doses equivalent to

175 mg/kg.Adhatoda vasica was also shown to have an abortifacient effect on guinea pigs, with effectiveness varying depending on the stage of pregnancy. The effects were more marked when estrogens were used as a priming influence, indicating that the actions of vasicine was probably mediated via the release of prostogladins

Insecticidal activity: Adhatoda vasica has been used for centuries in India as an insecticide. Its leaves have been shown to control insect pests in oil seeds, in both laboratory and warehouse conditions. Research has shown Adhatoda's alkaloid, vasicinol, to have an antifertility effect against several insect species by causing blockage of the oviduct. Research has also proven Adhatoda's effectiveness as an insect repellent.

Anti-bacterial activity: A leaf extract was investigated for antibacterial activity using the paper disc and dilution methods. In-vitro screening showed a strong activity of Adhatoda's alkaloids against the bacteria Pseudomonas aeruginosa. Significant antibacterial activity against the Gram-positive bacteria strains Streptococcus faecalis, Staphylococcus aureus, Staph epidermidis and the gram-negative E. coli were also noted

The prominent alkaloid found in Adhatoda leaves is the quinazoline alkaloid known as vasicine. In addition to vasicine, the leaves and roots of Adhatoda contain the alkaloids l-vasicinone, deoxyvasicine, maiontone, vasicinolone and vasicinol.. Research indicates that these chemicals are responsible for Adhatoda's bronchodilatory effect.

Mizaj (Temperament): Hot 1^{o} and Dry1^{o}

Musleh (Corrective): Honey and Gol morich

Badal (Proximal substitute): Other basak/bel phul/Tulsi

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent Appendix 2.2.2.
Total Ash	: Not more than 21 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 1 percent, Appendix 2.2.4.
Alcohol soluble Ash	: Not less than 3percent, Appendix 2.2.6.
Water soluble extractive	: Not less than 22percent, Appendix 2.2.7.

TLC: TLC petroleum ether extract on silica gel "G plate" using pet. Ether: Ethyl acetate (24:1) shows five major spots on spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate for 10 minutes at 110^0C at Rf. 0.94, 0.42, 0.32, 0.24 and 0.13. Appendix 2.2. 10.

Aa'a mal-e-Adviya (Pharmacological Action): Munaffise Balgham (Expectorant);Dafe Tashannuj (Anti spasmodic) and Mudire Tams (Emmenagogue)

Muhall-e- Istamalat (Therapeutic uses): Sual (Cough),Zeequn Nafas (Asthma), Sil (Pthisis) and Wajaul Asnan (Odontalgia)

Meqdar-e-Khorak (Dose):5-10 ml leaf decoction; 3 gm powder.

Side effects/ adverse effects: Nausea and vomiting

Important formulations: Sharbate Ejaz; Sualin, Sadar and Sharbate Arusa.Qurse Surfin.

ASROL

(Root)

Rauvolfia serpentina, the Indian snakeroot or devil pepper, is a species of flower in the milkweed. It is native to the Indian subcontinent and East Asia.It containedsome important alkaloids of the indole group including ajmaline, ajmalicine, reserpine, and serpentine,

Other Names:

a. Botanical Name: *Rauwolfia serpentina* (Linn). Benth

b. Family: Apocyanaceae

c. Bengali Name: Chaandar/Sarpagandha

d. English Name: Rauvolfia root/ Serpentina Root.

Description

a. General: The drug Asrol consists of air dried root of *Rauwolfia serpentina* (Linn). Benth belongs to Family –Apocyanaceae; a perennial undershrub widely distributed in India, Bangladesh and in the Sub Himalayan tracts up to 1000 meter as well as in the lower range of eastern and Western Ghats and in the Andaman.

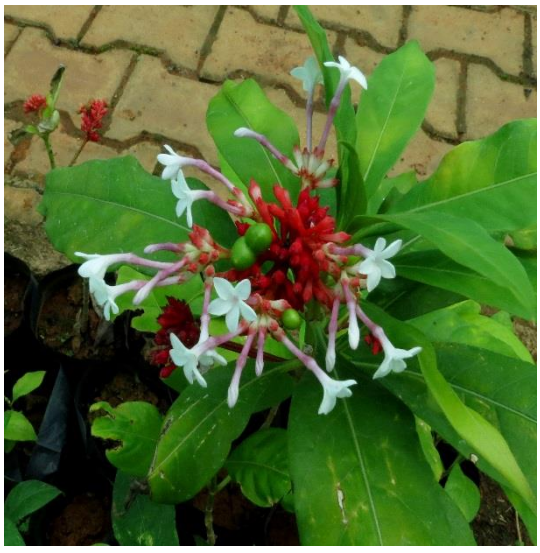


Fig:No 2: Sarpogondha plant and Root

b. Macroscopic: The pieces of Asrol roots mostly about 8 to 15 cm long and 0.5 to 2 cm in thickness, sub-cylindrical curved, stout , thick and rarely branched; outer surface greyish – yellow to brown with irregular longitudinal fissures; rootlets 0.1 mm in diameter, fracture, short, slight odor and bitter taste.

c. Microscopic**:** Root: Root consists of stratified cork of about 18 layers, of which the cells of 8 to 12 layers are smaller, suberized and unlignified; cells of remaining layers large, suberized and lignified; phelloderm parenchymatous; some cells packed with starch grains and prismatic and clusters crystals of calcium oxalate; secondary phloem tissue consists of sieve cells, companion cells and parenchymatous cell containing starch grain and crystal calcium oxalate; phloem fiber absent; phloem parenchyma occasionally filled with granular substances; starch grains mostly simple but compound granules also occur with 2 to 4 components; individual granules spherical, about 5 to 15 cm in diameter, with well-marked hilum simple or split in a radiate form; stone cells are absent (distinction from many other species such as *R. canescens ; R. micrantha, R.densiflora ; R perkansis and R vomitoria*); secondary xylem is traversed by well-developed lignified medullary rays of about 1 to 5 cell wide but uniseriate rays are more prominent; vessels singly or in pairs.; xylem parenchyma cells lignified; fiber present; cells of medullary rays thick walled also filled with starch grains and calcium oxalate prisms.

d. Powder: Coarse to fine, yellowish-brown, free flowing, odour slight, bitter in taste; characterized by spherical, simple to compound starch grains, calcium oxalate prisms and clusters; vessels with simple perforation, occasionally tailed; tracheids lignified; xylem fibers irregular in shape, occurs singly or in small groups, walls lignified, tips occasionally forked or truncated; wood parenchyma cells are filled with calcium oxalate crystals and starch grains; stone cells phloem fibers absent.

Parts used: Root

Habitat: India, Bangladesh and Indian Subcontinent.

Chemical Constituents: Rauwolfia contains indole alkaloids, such as reserpinine, serpentinine and ajmalicine.

Afa'al-e-Adviya (Pharmacological activities):

Antibacterial activity: The Agar well diffusion method was used to evaluate grown in the antibacterial activity and incubated at 37˚C for 24 hrs. After incubation period is finished the absorbance of the culture was adjusted to 0.5 according to McFarland turbidity standard with sterile nutrient broth. The 0.02 ml.of the culture was seeded on the sterile petri plates containing sterile Muller Hinton Agar media. The well was bored with 9 mm. Borer in seeded Agar. Then the 100 (µl) of the plant extract was added in each well. Plates were then incubated at 37˚C for 24 hrs. After incubation period was finished the zone of inhibition (mm.) was measured and recorded against Bacillus subtilis (gram + ve), Staphylococcus (local) (gram +ve) , Pseudomonas aeruginosa (gram – ve), klebsiella pneumonia (gram – ve) and Salmonella typhimurium (gram –ve) bacterias.

Antioxidant Activity: Preliminary studies medicated the reduction of Fe3+ FRAPreagent to Fe2+. The tested concentration was raised from 50-5000(µg). The data showed the continuous increase in the FRAP value till 141.0 µm after which the FRAP value assumed nearly the constant value (180 µm), showing levelling effects. The possibility of its application in a judicious manner as a dose for treating the ill effect of the overproduction of free radicals can not be ruled out.

Anti-typertensive activity: Reserpine is an adrenergic blocking agent used to treat mild to moderate hypertension via the disruption of norepinephrine vesicular storage. The neurotransmitters that are not sequestered in the storage vesicle are readily metabolized by monoamine oxidase (MAO) causing a reduction in catecholamines.

Mizaj (Temperament): Cold4^0 and Dry 4^0

Musleh (Corrective): Gol morich

Badal (Proximal substitute): No proximal substitute is identified**.**

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 8 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 1 percent, Appendix 2.2.4
Alcohol soluble Ash	: Not less than 4 percent, Appendix 2.2.6

Water soluble extractive : Not less than 10 percent, Appendix 2.2.7.

TLC: TLC of the methanolic and ammonia extract of root powder on silica gel "G plate" using Toluene: ethyl acetate:Diethyl amine (70:20:10) shows eight spot of spraying with Dragendorff reagent at Rf. 0.11, 0.13, 0.25, 0.37, 0.47, 0.51, 0.61 and 0.82 (all reddish brown). The spot of Rf-0.82 is of reserpine. Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Musakkin, Mukhaddir, Musakkine asab, Musakkin e Fisheruddam Qabi, Tiriaqa samoon and Munabbim.

Muhall-e- Istamalat (Therapeutic uses): Junoon; Ikhtinaqur Rehm, Fisheruddam Qabi, Sehar and Sara

Meqdar-e-Khorak (Dose) : 0.5gm-10 gm

Side effects/ adverse effects: Nausea, vomiting, diarrhea, loss of appetite; headache, dizziness, drowsiness; breast tenderness or swelling; itching or rash.

Important formulations: Dawa-us-Shifa; Sufoof Usrol; Habbe Shifa; Syp Niswan. Capsule Rauwolfia; Tablet Rauwolfia.

B A K A Y IN

(Fruit)

It's a dried fruit of Bakayin tree. A small to medium deciduous tree attaining a height up to 45 m tall; bole fluted below when old, up to 30-60 (max. 120) cm in diameter, with a spreading crown and sparsely branched limbs.

Other names:

a) Botanical / scientific name:*Melia azedarach* Linn.

b) Family: Meliaceae

c) Bengali name: Ghoranim or Mahanim Fol

d) English name: Fruit ofPersian lilac, Lilac,Indian Lilac, Barbados lilac, Chinaberry, Paradise tree, White cedar, Umbrella tree, Bead tree, Syringa., Hoop tree, China tree, Pride of India.

Description:

a) General: It is grown as an ornamental avenue tree and sometimes as a shade tree in coffee and tea plantation. The plant regenerates freely from seeds during rain under natural condition. It can also be artificially propagated by direct sowing, transplanting seedlings from nursery or by cutting and root suckers. Bark is smooth, greenish-brown when young, turninggrey and fissured with age. Leaves are alternate, 20-40 cm long, bipinnate or occasionally tripinnate. Leaflets 3-11, serrate, dark green on the upper surface and paler underneath. They produce apungent odour when crushed. Inflorescence a long, axillary panicle up to 20 cm long. Flowers are purple and fragrant, numerous on slender stalks, white to lilac; sepals 5-lobed, 1 cm long; pentamerous, each petal 5-lobed, 0.9 cm long, pubescent; staminal tube deep purple blue brown..6 cm long. Fruit or berries are small, yellow drupe, nearly round, about 15 mm in diameter, smooth and hard as a stone, containing 4 to 5 black seeds. Seed are oblongoid, 3.5 mm x 1.6 mm, smooth, brown and surrounded by pulp.

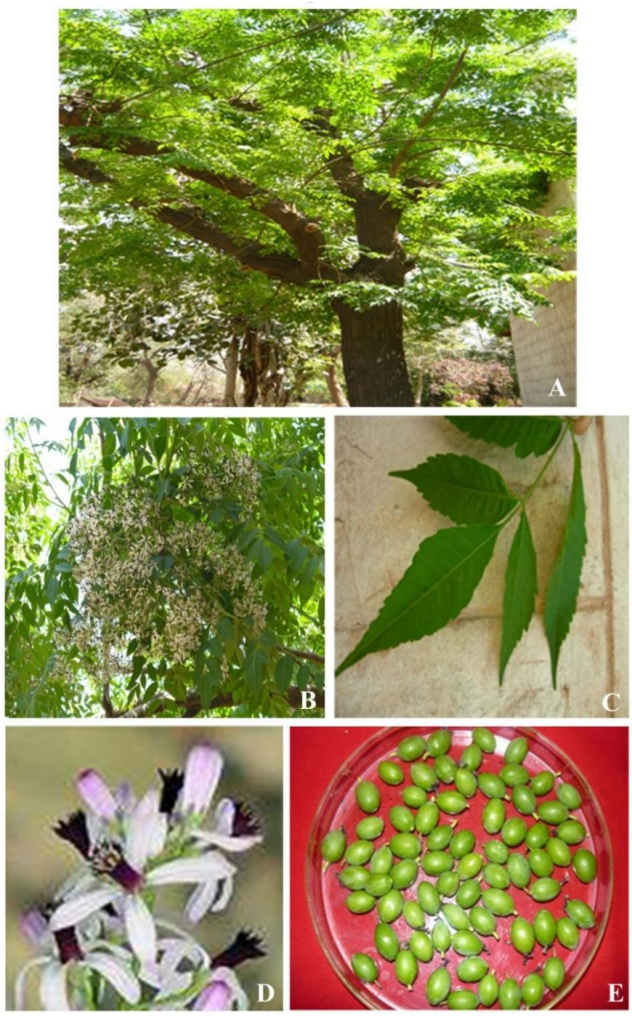


Fig. A: *Melia azedarch* **Linn. Tree**
Fig. B: Inflorescence of *Melia azedarch* **Linn.**
Fig. C: Closeup view of Leaf
Fig. D: Closeup view of Flower
Fig. E: Immature Fruits

b) Macroscopic:Drupes ovoid to globose, upto 15mm long and 12 mm wide, yellowish brown to chocolate brown, skin wrinkled, pericarp hard and creamish in colour; single stone present, upto 5.0 mm, long, ovoid or globose, brown, slightly flat at apex, 5 ridged, endocarp hard to break, 5 chambered and each chamber contains a single seed; reddish-brown in colour, 2.5 to 3.5 mm long and 1.0 to 2.5 mm broad, shiny, lanceolate; taste of the seed slightly bitter than pericarp but agreeable; odour unpleasant.

c) Microscopic: Transactional view of the fruit wall shows a cuticle followed by a single layer of epicarp consisting of rectangular to squarish, thick walled parenchymatous cells with slightly irregular walls containing yellowish-brown pigments; the mesocarpic region is of 3 or 4 layers in depth and is composed of rectangular to tangentially elongated, thick walled parenchymatous cells which contain oil globules; lower region of mesocarp parenchymatous cells, gradually reducing in size nearer the endocarp; a very few cells in the lower region

possess rosette crystal of calcium oxalate. At few places in the mesocarpic region secretory cavities present. Theendocarp is mainly composed of highly lignified cells; contents of the cells give positive test for tannins.

Cross section of seed shows a cuticle and a testa which is generally made up of two layers of cells. The outer consists of rectangular to slightly elongated, thin walled Parenchymatous cells, and inner comprised of slightly radially elongated, thick and straight walled cells possessing yellowish-brown contents; beneath this there are 5 or 6 layers of tegmen consisting of compact, hexagonal to polygonal, thin walled Parenchymatous cells with pigments; cells of the endosperm are compact, large, tangentially elongated thin-walled Parenchymatous filled with aleurone grains and oil globules.

Powder : Powder brown, coarse and tree-flowing, taste slightly bitter but agreeable with unpleasant odour, fragments of epicarp, mesocarp, testa, tegmen, endospermic cells, parenchymatous cells containing aleurone grains and oils globules in abundance, fibre and vessels are also seen but less in number. Rosette crystals of calcium oxalate are occasionally found, some elongated fibres and fibre-tracheids are also present. The fibres are quite long upto 600 µ in length and 13.0 µ in width, thick walled lignified with narrow lumen and ends tapering; sclereids present, 40 to 120 µ broad. Vessels are short, broad, lignified and have annular or spiral thickenings.

Parts used: Root bark, fruit or berry, seeds, flowers, leaves oils and gum.

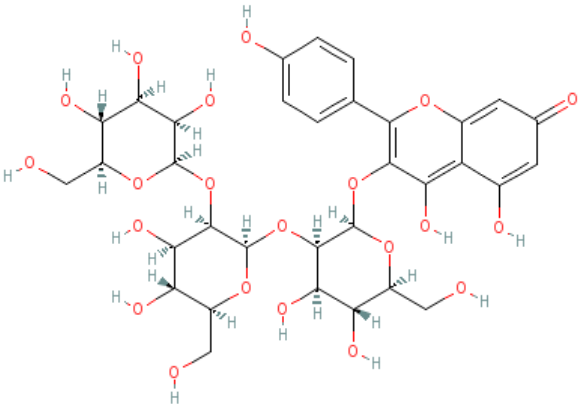
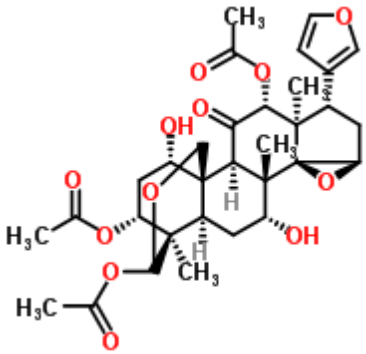
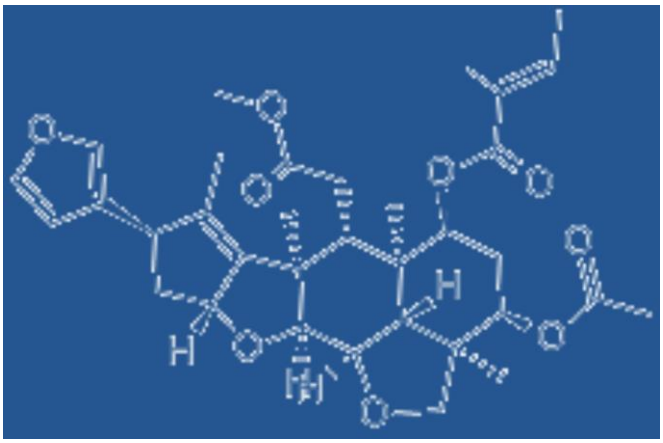
Habitat: It grows in temperate and tropical countries like Bangladesh, India, China, and Japan.

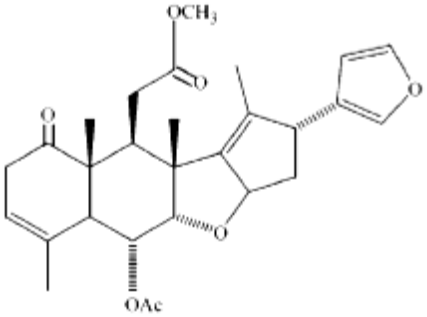
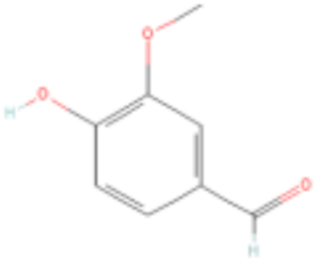
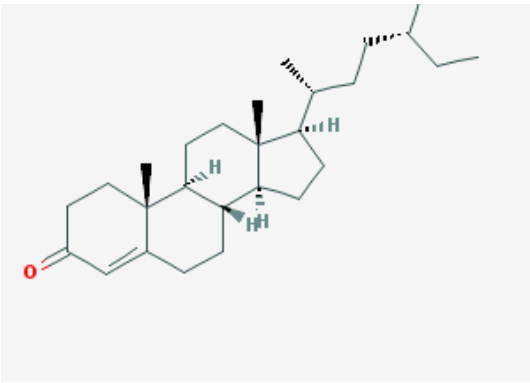
Phytoconstituents:

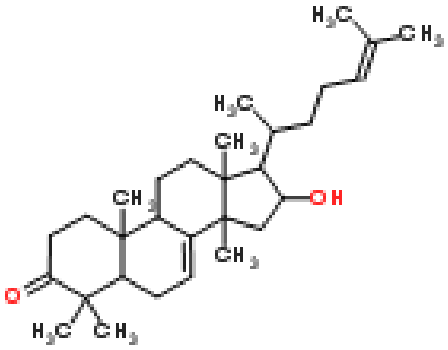
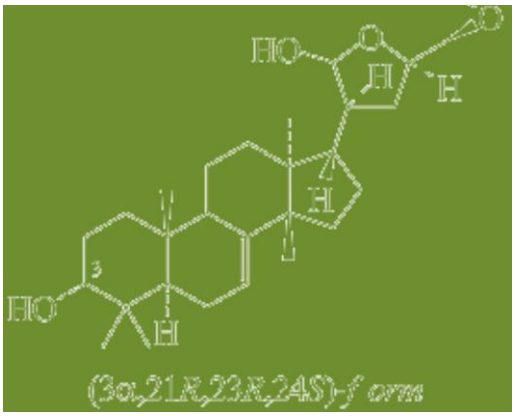
Bitter principle- Bakayanin, Alkaloid azridine (Margosine), a brown resinous substance, a non-bitter acidic substance, a sterol and tannins.

Plant grown at stable growth rates and provided with a balanced and proportionally increasing nutrient supply would exhibit different chemical properties. *Melia azedarach* L. has active ingredients like triterpeniods, limonoids, steroids, flovonoids and carboxylic acid and other chemical ingredients. Different Parts of *Melia azedarach* L. contain different types of phytochemicals which contributed in different biological activities (Table - 1).

Table 1. Chemical constituents of different plant tissues of *Melia azedarach* Linn.

Plant Part	*Chemical Name*	*Chemical Structure*
Leaves	Kaempferol	 Kaempferol is a polyphenolic flavonoid. Kaempferol is a natural plant product. It reduces cancer, arteriosclerosis, cardiovascular disorder, and serve as antioxidant and anti-inflammatory.
Fruits	Sendanin	 The limonoid compound (28-deacetyl sendanin) isolated from the fruit of *Meliatoosendan* SIEB. et ZUCC. was evaluated on anticancer activity.
Root	Salannin	 The salannin is a limonoids type of compounds, which are characterized by the two oxygen bridges C-6/28 and C-7/14.Salannin compound shows antifeedant properties

		against various insects.
Seed	Nimbinene	 Nimbinene are new pentanortriterpenoids in which the double bond and carbonyl group are not conjugated, and C-4 methyls have been last along with four carbons of the side chain. Nimbinene shows activeantifeedant activity.
Cortex	Vanillin acid	Vanillic acid is a dihydroxybenzoic acid derivative used as a flavoring agent. It is an oxidized form of vanillin. It is also an intermediate in the production of vanillin from ferulic acid. Vanillic acid shows stronger antioxidant activity. 
Bark	Stigmasten-3-one	 The Stigmasten-3-one is a Steroid compound 6b-hydroxy- 4-stigmasten-3-one and 6b-hydroxy-4-campesten-3-one was isolated from bark and their structures confirmed by partial synthesis and shows antimicrobial, antioxidant and anti-inflammatory.

Stem bark	Kulinone	 The kulinone is a tetra cyclic triterpenoids of the eophane (20β –H) 1 series, for which the name “kulinone ’’ is proposed. This compound shows antimicrobial and antifeedant activity.
Root bark	Melianol	 The structure of melianol anew tetracyclic triterpenes of the tirucallane type. The side-chain is characterised by the presence of a hemiacetal and of an oxiran ring. This compound shows insecticidal activity and antifeedant activity

Af’aal-e-Adviya (Pharmacological Activities):

Some of Af’aal-e-Adviya (Pharmacological activities) are describe here.

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risk of cancer and weight gain, therefore, search for new antifertility molecule with minimum side effects continues. Vishnukanta and Rana in the year 2009 studied hydro-alcoholic extract of M. azedarach roots for anti-implantation, estrogenic/anti-estrogenic and progestational/anti-progestational activities. It was found that the extract exhibited significant antiimplantation and anti-progestational activity and devoid of estrogenic/anti-estrogenic activity. It is therefore assumed that a certain substance was present in the extract which impairs the synthesis, secretion and functions of ovarian steroids and also blocks the implantation process by hindering the development of oocycte and graffian follicle as well as the endometrial epithelium.

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Mizaj (Temperament): Hot- Dry2^0

Musleeh (Corrective): Not require.

Badal (Proximal substitute): No proximal substitute is identified.

Identity, purity and strength:

Foreign Matter	-	Not more than 2%,	Appendix 2.2.2.
Total Ash	-	Not more than 8%,	Appendix 2.2.3
Acid insoluble ash	-	Not more than 2%,	Appendix 2.2.4
Alcohol-soluble extractives	-	Not less than 16%,	Appendix 2.2.6
Water-soluble extractives	-	Not less than 25%,	Appendix 2.2.7

TLC behavior ofethanolicextract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Toluene : Ethyl Acetate (93:7)	On spraying plate with5% Ethanolic conc. H_2SO_4	5	0.27, 0.50 0.58,0.74 0.94

Aa'maal-e-Adviya (Pharmacological Action):

Musaffi-e-Dam, Mohalil-e-waram, Musakkin-e- Alam, Munaqqi, Qatil-e-Kirm-e-ama, Dafa-e-Humma, Qabiz, Mudirr-e-Baul, Daf-e-Bawaseer

Mahall-e-Istemalat (Therapeutic use): Nuqras, Jaryan, Waj-ul-Mafasil, Bawaseer, Waj-ul-Uzn

Meqdar-e-Khorak (Dose):1-3 gm

Side-effects / adverse-effects: The ripe flesh is non-toxic but seeds is toxic.

Important formulations: Habb-e-Bawaseer, Majoon Musakkin Dard-e-Rahem, Tila-e-Musakkin

B A K A Y IN

(Leaf)

This drug is dried leave of Bakayin tree (*Melia azedarach* Linn (Meliaceae). This is a small to medium deciduous tree attaining a height up to 45 m tall; bole fluted below when old, up to 30-60 (max. 120) cm in diameter, with a spreading crown and sparsely branched limbs.

Other names:

a) Botanical name: *Melia azedarach* Linn

b) Family: Meliaceae

c) Bengali name: Ghoranim or Mahanim Pata

d) English name: Leaf of Persian lilac, Lilac,Indian Lilac, Barbados lilac, Chinaberry, Paradise tree, White cedar, Umbrella tree, Bead tree, Syringa., Hoop tree, China tree, Pride of India.

Description:

a) General: It is grown as an ornamental avenue tree and sometimes as a shade tree in coffee and tea plantation. The plant regenerates freely from seeds during rain under natural condition. It can also be artificially propagated by direct sowing, transplanting seedlings from nursery or by cutting and root suckers. Bark is smooth, greenish-brown when young, turninggrey and fissured with age. Leaves are alternate, 20-40 cm long, bipinnate or occasionally tripinnate. Leaflets 3-11, serrate, dark green on the upper surface and paler underneath. They produce a pungent odour when crushed. Inflorescence a long, axillary panicle up to 20 cm long. Flowers are purple and fragrant, numerous on slender stalks, white to lilac; sepals 5-lobed, 1 cm long; pentamerous, each petal 5-lobed..9 cm long petals 5-lobed, 0.9 cm long, pubescent; staminal tube deep purple blue brown.0.6 cm long. Fruit or berries are small, yellow drupe, nearly round, about 15 mm in diameter, smooth and hard as a stone, containing 4 to 5 black seeds. Seed are oblongoid, 3.5 mm x 1.6 mm, smooth, brown and surrounded by pulp.

b) Macroscopic: Dried broken rachis and leaves; rachis 23 to 45 cm long; leaves imparipinnate, with pinnae opposite, 3 to 11, ovate or lanceolate, upto 8 cm in length and upto 2.5 cm in width, acuminate, obtusely serrate, oblique at the base, petiolules short, slender; only faintly bitter which distinguishes them from leaves *of Azadirachta indica* which are intensely bitter; odourless.

c) Microscopic:Rachis: Transverse section of epidermis of the rachis shows unicellular trichomes andmulticellular glandular trichomes on unicellular stalk; a wide cortex, some cells containing rosette crystals of calcium oxalate; vascular tissues nearly circular in the middle region of the rachis, but compressed and ellipsoid at the stalk region.

Midrib: Shows a ridge above and below, single layered epidermis, covered with cuticle on bothsurfaces, cortex consists of 2 to 3 layers of collenchymatous cells on both sides followed by thin walled parenchyumatous cells; vascular region shows arc of xylem after with three subsidiary bundles; crystals distributed in cortical region.

Lamina: Isobilateral, thick cuticle present; single layer of epidermal cells: multicellularglandular and unicellular long trichomes present; single layer of palisade cells present, some dividing pereclinically; occasionally some of them contain rosette crystals of calcium oxalate; the lower epidermal cells are similar to the upper epidermal cells but somewhat smaller in size; straight walled in surface view; stomata only on lower surface; palisade layer adjoining the lower epidermis is characterized by cells which are smaller than the upper palisade cells; spongy parenchyma in between; vascular bundles present, with xylem vessels showing spiral thickening,

Powder:Yellowish brown, no odour, slightly bitter; microscopic examination of the powdershows fragments of epidermis which bear multicellular glandular and unicellular long trichomes, two types of palisade cells, large and small, crystals of calcium oxalate, spiral and pitted xylem vessels.

Parts used: Leaves Root bark, fruit or berry, seeds, flowers, leaves oils and gum.

Habitat: It grows in temperate and tropical countries like Bangladesh, India, China and Japan.

Phytoconstituents:

Leaves contain terpenoids and limonoids like l-Cinnamoyl-3-acetyl-11-hydroxy meliacarpin, l-Cinnamoyl-3-methacrylyl-l1-hydroxy meliacarpin, Deacetyl salannin, 1,3-Dicinnamoyl-l1-hydroxy-rneliacarpin, α-Pinene, β-Pinene, α-Terpinene, α-Terpineol,Kaempferol-3-O-β-rutinoside, Kaempferol-3-L-rhamno-D-glucoside, Rutin. They also contain acids like Palmitic acid (hexadecanoic acid).

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TLC behavior of ethanolic extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Toluene : Ethy Acetate (93:7)	On spraying plate with 5% Ethanolic conc. H_2SO_4	5	0.13 0.30 0.40 0.48 0.55

Aa'maal-e-Adviya (Pharmacological Action):

Musaffi-e-Dam, Muhallil-e-Awram, Musakkin-e- Aam, Daf-e-Bawasir, Muqqwwi-e-Dandan, Qatil-e- Kirm-e- Ama, Munaqqi, Daf-e-Humma, Qabiz, Mudirr-e-Baul

Mahall-e-Istemalat (Therapeutic use):

Juzam, Bars, Bawaseer, Qabz, Suda, Jaryan, Ehtabas-e-Tams

Meqdar-e-Khorak (Dose): 1-2 gm

Side-effects / Adverse-effects: No significant side effects / Adverse-effectshave been observed

Important formulations:

Habb-e-Bawaseer, Majoon Musakkin, Dard-e- Rahem, Tila-e-Musakkin

BISBASA

(Aril)

Myristica fragrans is an evergreen tree, usually 5–15 m (16–49 ft) tall, but occasionally reaching 20 m (66 ft) or even 30 m (98 ft) on Tidore. The alternately arranged leaves are dark green, 5–15 cm (2.0–5.9 in) long by 2–7 cm (0.8–2.8 in) wide with petioles about 1 cm (0.4 in) long.

Other names:

a. Botanical Name: *Myristica fragrans* Houtt./*Myristica officinalis* Linn

b. Family: Myristicaceae

c. Bengali/ Name: Jayatri

d. English Name: Arillus of the Nut Mace.

Description

a. General:The drug Bisbasa consists of dried aril of *Myristica fragrans Houtt./ Myristica officinalis* Linn belongs Family Myristicaceae. A medium sized evergreen tree 8-15 m high, native of the East Moluccas.It is cultivated in Malaya Peninsula and the Malaya Islands. In India, it is found in a few localities, chiefly botanical gardens, Kerala where the climate is sufficiently hot and moist.

Fig: No: 21: Bisbasa (Aril)

b. Macroscopic**:** The drug consists of reddish pieces of about 2-4 cm size. They are flat, smooth, irregularly slit, slightly flexible or brittle. When pressed the drug exudes reddish or orange colored oily substance.

c. Microscopic**:** The cross section of the aril shows somewhat leaf like structure. It is bounded by single layered epidermis on either sides, the rest of the area is occupied by simply thick walled cells with oil cavities in abundance.

Parts used: Aril

Habitat: Bangladesh, America; Sumatra and India

Chemical Constituents: Fats, terpenoids, Phenols, Alcohol, Saponins, Resins, Starch, Carbohydrates, Aluminium, Strontium, Calcium, Potassium, Sodium, Sulphate and Phosphate.

Afa'al-e-Adviya (Pharmacological activities):

Analgesic activity: Animal were divided into four groups (4 animals in each group), as group 1: Control (Saline water treated); group 2: Positive control (Diclofenac treated);group 3: Myristica fragrans Houtt (Mfsm) 200mg/kg; group 4: Myristica fragrans Houtt (Mfsm) 400mg/kg.After administration of the different dose of methanolic extract of Myristica fragrans Houtt (Mfsm) and standard drug diclofenac as the positive control, the numbers of writhing reduced and ensured analgesic effects. By comparing the number of writhing with the untreated control group Myristica fragrans Houtt (Mfsm) showed almost similar % of inhibition as 68.10% at the dose of 400mg/kg.

Antidiabetic activityon alloxan-induced diabetic mice: The consequences after chronic administration of Myristica fragrans Houtt (Mfsm) showed meaningful antihyperglycemic action between investigational and diabetic control mice. At a dose of 200 mg/kg body weight, Myristica fragrans Houtt (Mfsm) significantly lowered blood glucose level and showed reduction of 22.48 % while at 400 mg/kg Myristica fragrans Houtt (Mfsm) body weight dose, produced maximum reduction of 44.78% of blood glucose level, respectively, inhibition of blood glucose level 62.01 % was found for vildagliptin (50 mg /kg) on day 4 as a peak.

Pharmacological studies on Myristica fragrans--antidiarrheal, hypnotic, analgesic and hemodynamic (blood pressure) parameters. A study was therefore planned to assess the

various pharmacological effects (antidiarrheal, sedative, analgesic and blood pressure) of nutmeg.

Mizaj (Temperament): Cold $2^0$and Moist 2^0

Musleh (Corrective): Babla gum and Golap pani

Badal (Proximal substitute): Jayphal.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 4 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 3 percent, Appendix 2.2.4.
Water soluble ash	: Not less than 3percent, Appendix 2.2.5
Loss on drying at 100^oC	: Not more than 14 percent, Appendix 2.2.9
Alcohol soluble extractive	: Not less than 5 percent. Appendix 2.2.6.
Water soluble extract	: Not less than 13percent, Appendix 2.2.7

TLC: TLC of pet. Ether (60-80) extract of the drug on precoated aluminium plate of silica gel 60F-254 using Benzene: Chloroform (4:1) as a solvent system shows seven spots at Rf 0.24 (light orange). 0.27 (pinkish purple), 0.17, 0.23, 0.35, 0.43, 0.50, 0.79 and 0.91 (all light orange) on spraying with 4% ethanolic-Sulphuric acid reagent and heating the plate for 10 minutes at 110^0C in oven. Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Muqabbie Meda (Stomach tonic);Hazim (Digestive); Kasire Riya (Carminative) and Muqabbie Qalb (Cardiac Tonic)

Muhall-e- Istamalat (Therapeutic uses):Su-e Hazm (Dyspepsia) and Zofe Bah (Sexual Debility)

Dose:2-5 gm

Side effects/ adverse effects: Headache and may cause Hepatibiliary disturbance for hot temperamental person.

Important formulations: Anoshdaru. Halwa-e Baiza e Murgh, Itrifal-e-Kabir; Jawarish a Bisbasa; Jawarish e Kundur, Jawarish e Narmusk ; Jawarish eUtraj; Jawarish e Zarooni sada, Luboob e Kabir, Majoon e Aarad Khurma, Majoon eBaladur; Majoon e Bandkhusad; Majoon e Muluki; Majoon e Nankha; Majoon e Salab,Mufarreh Sosambari, Raughan –e Babuna Qabi; Arq-e-Chobchini.Kurse Espand.

CHOBCHINI

(Tuberous root)

Smilax china is a climbing plant species in the genus *Smilax*. It is native to China, Korea, Taiwan, Japan,Philippines, Vietnam, Thailand, Myanmar, and Assam. it is one of the safe and efficacious medicines used traditionally for the treatment of various ailments. This review describes various facets like active constituents, morphological characters and pharmacological properties of its individual ingredients. In various pharmacological studies undergone earlier the both plants of Smilax china and Smilax zeylanica showed antimicrobial, anthelmintic, anti oxidant, anticancer, hepatoprotective property. This review is carried out to scientifically indicate the traditional use of plants of Smilax china

Other names:

a. Botanical Name: Smilax china Linn

b. Family: Liliaceae

c. Bengali Name: Chopchini

d. English Name: China root

Description

a. General:The drug chobchini consists of tuberous root of *Smilax china* Linn belongs to family Liliaceae, a deciduous climber with sparsely prickled or unarmed stem. It is imported from China and Japan.

Fig: 36: Chobchini plant and Root

b. Macroscopic**:**Tubers about 6 to 12 cm long, 2 to 4 cm wide, rough, irregular, cylindrical, curved, slightly tapering with brownish or blackish scars; externally brownish yellow in ccolor and internally brown in color; fracture hard; odour not characteristic; taste: slightly bitter.

c. Microscopic**:**Cortex shows several layers of thin walled, polygonal, elongated mucilaginous parenchymatous cells, a few cells containing raphids of calcium oxalate, endodermis not distinguished; ground tissue having several vascular bundles consisting of usual elements; fibers long and aseptate; numerous simple and compound starch grains measuring 16 to 38 micron in diameter with 2 to more than 9 components mostly spherical to ovoid having hilum in center.

d. Powder**:**Shows light brown, fragments of mucilaginous parenchymatous cells of cortex fibers and vessels with reticulate thickening a few scattered needles of calcium oxalate from raphides; numerous simple and compound starch grains measuring 16 to 38 micron in diameter with 2 to more than 9 components mostly spherical to ovoid having hilum in center.

Parts used: Tuberous root

Habitat: China, Korea, Taiwan, Japan,Philippines, Vietnam, Thailand, Myanmar, and Assam

Chemical Constituents: Saponins, sarsaponin and parallin which yield isomeric sapogenins, sersapogenin and smilogenin. It also contain sitosterol and stigmasterol as free form and as glucosides.

Afa'al-e-Adviya (Pharmacological activities):

Anti-inflammatory activity: The presence of Sieboldogenin in Smilax china shows the significant lipoxygenase inhibition (IC50: 38μM). It also exhibited significant inhibition ($p<0.05$) of carrageenaninduced hind paw edema at the doses of 10 and 50mg/kg. Computational molecular docking shows that the molecular interaction with essential amino acid residues in the catalytic site of lipoxygenase, revealing its potential binding form at molecular level.

Anticancer activity: The anticancer activity of eight crude extracts of Smilax china rhizome (SCR) against HeLa cells was assessed by MTT assay and clonogenic assay, the fraction rich in flavonoids had showngood activity against HeLa cells. A bioassay-guided separation on this extract lead to the detection of kaempferol-7-O-β-D-glucoside (KG), which belongs to flavonoid glycoside, displayed marked anticancer activity.

Antioxidant activity: The ethyl acetate fraction of Smilax china showed the highest antioxidant property, correlating with the high phenolic levels, particularly catechin and epicatechin . In this study, a possible presence of antioxidant activity of Smilax china root extract was investigated. Methanol extract (Me) revealed the presence of high 1,1-diphenyl-2- picrylhydrazyl (DPPH) free radical scavenging activity (IC50 7.4 μg/ml) and protective property of cell's viability. Further fractionation with various solvent extraction and assay showed high levels of DPPH free radical scavenging activity in the ethyl acetate, butanol and water extracted fractions. In addition, V79-4 cells treated with Me of Smilax china root induced an increase of superoxide dismutase, catalase and glutathione peroxidase activities in a dose-dependent manner between 4-100 μg/ml. These results suggest that the medicinal component of the root of Smilax china extracts also contains antioxidant activity

Antidiabetic activity: The methanolic extract of Smilax china has significant Antidiabetic activity in Alloxan induced diabetes in rats. The maximum reduction in glucose level was seen at the dose of 400mg/kg b.w.The antidiabetic activity may be due to promotion of insulin secretion by closure of potassium-ATP channels, membrane depolarization and stimulation of Calcium influx, an initial key step in insulin secretion

Mizaj (Temperament): Hot and Dry /Hot 1^0& moist 1^o

Musleh (Corrective): Unknown

Badal (Proximal substitute): Root of Kumari lata

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 0.6 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 0.06 percent, Appendix 2.2.4.
Alcohol soluble extractives	: Not less than 0.08 percent, Appendix 2.2.6.
Water soluble extractives	: Not less than 5 percent, Appendix 2.2.7.
Essential Oil	: Not less than 0.2 percent, Appendix 2.2.8.

TLC: TLC of alcoholic extract on pre-coated silica gel "G plate" using Toluene: Ethyl acetate: Methanol (10:10:4) as mobile phase and on spraying with Anisaldehyde-Sulphuric acid reagent and heating the plate for 10 minutes at 105^0C shows ten spots at Rf. 0.09 (dark green), 0.17(violet), 0.21 (dirty yellow), 0.26 (grey), 0.32 (yellow), 0.48, 0.55 and 0.58 (all violet), 0.73 (greenish blue) and 0.77 (violet). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Muqabbie Azae Raisa ; Muqabbie Khoon; Mohallil, Mulatiff ; Muarriq; Muqabbie Bah; Mudire Baul wa Haiz; Munabbim wa musakkin**.**

Muhall-e- Istamalat (Therapeutic uses): Suda Muzmin, Shaqiqa, Nazla, Zukam, Zof Bah, Fasd Dam, Wajaul Mafasil

Meqdar-e-Khorak (Dose):5-10 gm

Side effects/ adverse effects: Excess use may be harmfull for hot temperamental people, child and male. Nausea and Vomiting may be seen.

Important formulations: Majoon Chobchini.

G U L - E - S U R KH

(Flower)

Gul-e-surkh is a dried flower of shrub plant of *Rosa damascene* Mill. It's a most famous than any other flower throughout the world. It belongs to the family Rosaceae.It is a small and aromatic plant, which appears in spring. It is an erect shrub, up to 2 m in height, brancheslong.

Other names:

a) Botanical name: *Rosa damascene* Mill

b) Family: Rosaceae

c) Bengali name: Golap phul

d) English name:OttoRose, Damascus Rose, Persian Rose, Bussora Rose, Damask Rose.

Description:

a) General: *Gul-e-Surkh*"Gulab", a paramount drug in *Unani System of medicine is a*flower of *Rosa damascene* mill. It isa prickly shrub or sometimesclimbing or trailing.

Stem: The stem is usually with numerous stout andhooked prickles, sometimes mixed with glandularbristles.

Leaves: The leaves are pinnate, stipules adnate (and scarcely dilatedstipules. Leaflets are usually 5- 7 in number and 2.5-6.3 cm long, ovate-oblong, serrate, more or lesspubescent beneath.

Flowers: There are several flowers, arranged in acorymb, double, pink, red or white, born on glandular hispidand prickly pedicles, sweet-scented and sometimes striped. The flowersare bitter and sweetish.

Pedicles: Thepedicles and receptacles are glandularhispid

Sepals: The sepals are deciduous, reflexing duringflowering time.

b) Macroscopic:

Flowers: The flowers are hermaphrodite, complete andperigynous. They are double red, pick, white.

Gul-e-Surkh drug consists of small intact flowers including prickly pedicel and separated floral parts; sepats"5, lanceolate, apex-attennuate, entire, 1.5 to 2.0 cm long and 0.4 to 0.7 cm broad, reddish brown; petals many; stamens many inserted on the disc pistil apocarpus, carpels free but wholly enclosed within calyx tube, covered with hair; ovary inferior, odour pleasant, taste astringent.

c) Microscopic: **Pedicel:** Cuticle present; shows single layer epidermis of radially elongated unequal thin walledparenchymatous cells containing yellowish-brown contents, hypodermal region characterized by the presence of collenchymatous cells, oval to circular, 3-4 layers in depth and possessing yellowish-brown contents; cortex composed of 8-10 layers of slightly thick walled parenchymatous cells, oval to circular, with intercellular spaces, a few cells containing rosette crystals of calcium oxalate; vascular bundle numerous, simple, collateral and radially arranged with a patch of sclerenchymatous cells capping it, medullary rays uni or biseriate, ray cells oval to radially elongated, thin walled parenchymatous. Pith well developed and composed of oval to circular thin walled parenchymatous cells with intercellular spaces.

Sepal: Transectional view of sepal shows a cuticle, epidermal cells carrying long, simple, unicellular and non-glandular trichomes; mesophyll undifferentiated and mostly composed

of several layers of slightly thick walled, polygonal to oval parenchymatous cells, some containing rosette crystal of calcium oxalate; vascular bundle found here and there in the mesophyll. Stomata present on lower epidermis, anamocytic.

Petal: In surface view, the epidermal cells are rectangular or somewhat elongated and thick walled; walls of the cell are reported to be zigzag or wavy that may be due to the dried petals used for study. Sectional view of the petal shows upper epidermal cells rectangular to squarish or radially elongated, thick walled with yellowish-brown contents; cuticle present mesophyll characterized by the compact, polygonal to, thick walled parenchymatous cells, their walls wavy showing presence of oral calcium oxalate crystals oval; vascular bundles are found at unspecific intervals in the mesophyll, much reduced, delicate vein generally consisting of a few narrow vessels with annular thickenings.

Stamen: The epidermis is single layered, thick walled and parenchymatous with cuticle;epidermal cells near the dehiscence point are small, oval to spherical but becomes gradually wider and radially elongated towards the connective, walls smooth endothecium a single layer near the dehiscence point but becomes gradually w-ider and radially elongated towards the connective; cells rectangular to squarish, thin walled parenchymatous and each cell contains a band of lignitled thickening; pollen grains oval with smooth exine, 30-36µ in length and 22-25 µin width.

Hypanthium: Epidermis single layer with rectangular to squarish thin walled parenchymatouscells, cuticle present; multilayered ground tissue of thin walled, oval to polygonal, small to large parenchymatous cells, first 2-3 layers having yellowish brown contents; starch grains present; several vascular strands are found scattered in the lower part of the region.

Powder: Powder Pinkish - brown, free flowing, taste astringent, and odour pleasant; reveals thepresence of fragments of floral epidermis; the cells of petal are rectangular to squarish or radially elongated with thick walls and cuticle present on outer side; hypodermis, cortical parenchyma cells containing rosette crystals of calcium oxalate or starch grains, a few thick walled parenchyma, epidermal layer w ith stomata, endothecium, oval pollen grains, measuring upto 36 |.i in length and upto 25)i in w'idth, starch grains, trichomes. Vessels, tracheids with pitted walls and large lumen, tlbres with narrow lumen, long and lignified and xylem parenchyma.

Part used: Flowers

Habitat:

Several species of Gul-e-Surkh are cultivated here. It is also cultivated in rose gardens in several places in Bengaladesh. This plant is cultivated in all over the world including Iran, Europe, Bulgaria, Turkey and India. Now a days, several cultivaters are cultivating in large scale in different places of Bangladesh.

Phytoconstituents:

Cyanidin-3.5 Digluoside B-Phenethyl-B-D glucopyranoside Citronellol, nerol, geraniol and phenyl ethanol. 2-Hydroxyursolic acid, B-amyrin and methyl-ursolate.

Rose flowers contain essential oil: citronellol, nerol, geraniol, β-phenyl ethanol and its glucoside, eugenol and methyl eugenol; organic acids, chlorogenic acid, tannin, cyanin, cyaniding and its 3,5-di-glucoside, quercitrin, carotene and sugars. B- phenethyl –β-D-glucopyranoside (1.0%) is also isolated from the flowers. Petals of red rose contain an aromatic volatile oil, a glucoside quercitrin gallic acid quercitannic acid and red coloring matter.

Rose oil: Acetic Acid, Butyric acid, Damacenone, Trans-Damacenone, Ethanol, Linalol, Myrcene, Neryl acetate, Eugenol, Nonanol, Pentanal, Phenyl ethyl alcohol, ß-Phenyl ethyl-ß-D-glucopyranoside, Farnesol, άand ß-Pinene, ß-Phenyl ethanol, Methyl heptenone, Salicyl aldehyde**.**

Af'aal-e-Adviya (Pharmacological Activities):

Some of Af'aal-e-Adviya (Pharmacological Activities) are described here.

Antibacterial activity of rose (Rosa damascena) essential oil has been reported against E. coli, Pseudomonas aeruginosa, B. subtilis, Staphylococcus aureus, chromo bacterium violaceum and erwinia carotovora strains. Among them, C. violaceum was most sensitive to rose essential oil and absolute and E. coli was also sensitive to the rose essential oil. The result exhibits that rose showed antibacterial activity against both gram-positive and gram-negative bacteria (Ulusoy et al., 2009).

A study was designed to evaluate the antimicrobial activity of aqueous extracts from *Rosa damascena* against 10 pathogenic microorganisms. The result showed that hexane extracts have very low activity against test microorganisms; ethanol and water extract significantly exhibited antimicrobial activity and inhibited the growth of gram positive and gram negative bacteria. Minimum inhibition concentration (MIC), Minimum bactericidal concentration (MBC) and the diameter of inhibition zone (DIZ) were determined against Staphylococcus

aureus, Pseudomonas aeruginosa, Pseudomonas, Acinetobacter calcaoceuticus, Salmonella enteritis and Aspergillus niger *(Halawani, 2014).*

An experimental study was carried out to evaluate the antibacterial activity of both fresh and spent flower extracts of Rosa damascena against 15 species of bacteria Aeromonas hydrophila, B. cereus, Enterobacter aerogenes, Enterococcus feacalis, E. coli, Klebsiella pneumonia, Mycobacterium smegmatis, Proteus vulgaris, Ps. aeruginosa, Ps. fluorescens, Salmonella enteritidis, Salmonella typhimurium, Staph. aureus and Yersinia enterocolitica. Both extracts were effective against all the bacteria except E. coli. Although the fresh flower extract was more effective than the spent flower extract. Fresh and spent flower extracts showed the strongest effects against S. enteritidis and M. smegmatis, respectively *(Ozkan et al., 2004).*

The effects of the essential oil of Rosa damascene as an adjunct in the treatment of children with refractory seizures were also studied and showed a significant reduction in the mean frequency of seizures in patients using essential oil of the plant. Therefore, the essential oil of Rosa damascena has beneficial antiepileptic effect in children with refractory seizures *(Ashrafzadeh et al., 2007).*

Antidepressant: A study was carried out to evaluate the antidepressant activity of aqueous extract of Rosa damascena. In this study forced swimming test was used and the duration of immobility time and swimming time of three doses of aqueous extract (15, 60, and 90 mg/ kg) in comparison with saline (negative control) and imipramine (positive control) was evaluated. The result showed that the two high doses of aqueous extract (60 & 90 mg/ kg) had no significant effect on these parameters while its low dose (15 mg/ kg) had significantly increased swimming time and decreased immobility time which suggests that the low dose of the extract possess antidepressant like activity (*Dolatiet al., 2011).*

Antioxidant: The antioxidant activity of the phenolic compound in the ethanolic extract was determined. It was compared to standard antioxidant L-ascorbic acid by 1, 1- diphenyl-2-picryl hydroxyl (DPPH) free-radical method. The study showed that *Rosa damascena* has high antioxidant activities (Kumar et al., 2009). The antioxidant activity of hydroalcoholic extract of petals and essential oil of *Rosa damascena* was evaluated by DPPH for measurement of free radical scavenging activity and by ferric ammonium thiocyanate method for evaluation of lipid peroxidation properties. Additionally, three flavonol glycosides of ethanolic extract including quercetin-3-O-glucoside, kaempferol-3-O-rhamnoside and kaempferol- 3-Oarabinoside have antioxidant activity. However, the potential of this effect is maybe due to the existence of quercetin 3-O-glucoside and other flavonoids in the extract

(Yassa et al., 2009). An experimental study was carried out to determine the antioxidant activity of hydroalcoholic extract of petals and essential oil of Rosa damascene using free radical scavenging activity with 2-2-diphenyl, 1- picrylhydrazyl (DPPH) and lipid peroxidation (ferric ammonium thiocyanate) methods. The hydroalcoholic extract showed strong free radical scavenging capacity compared to lipid peroxidation inhibitory effects. IC50 values of the extract were 2.24 μg/mL and 520 μg/mL in free radical scavenging and lipid peroxidation assays, respectively.

The antioxidant activity of both fresh and spent flower extracts of *Rosa damascena* was carried out. The result exhibited that the antioxidant activity of fresh flower extract was higher than that of spent flower extract (Ozcan et al., 2004).

Antispasmodic: A study was designed to determine the efficacy of Rosa damascena extract on primary dysmenorrhea. The participants received two capsules of mefenamic acid and *Rosa damascena* with the similar physical properties in two consecutive cycles per 6 hours for 3 days in a cross-over form. The result exhibited that *Rosa damascena* and mefenamic acid had similar effects on the intensity of pain in primary dysmenorrhea (Baniet al., 2014).

Antitussive An experimental study was carried out to evaluate the antitussive effect of the ethanolic and aqueous extract of *Rosa damascena* in guinea pig model. It was compared with the standard drug codeine. It was found that the antitussive effect of the ethanolic extract was greater than the aqueous extract. It is assumed that both extracts relieve a cough by suppressing cough center in central nervous system (Shafei et al., 2003).

Cardiac stimulant: The result of a study reveals that aqueous ethanolic extract from Rosa damascena potentially increased heart rate and contractility in isolated guinea pig heart. The mechanisms of these effects are unknown. However, a possible stimulatory effect of the plant on β-adrenoceptor of isolated guinea pig heart is suggested (*Boskabady* et al., 2011).

Dementia An active constituent of the chloroform extract of *Rosa damascena* was isolated which is a very long polyunsaturated fatty acid (VLFA) having molecular formula C37H64O2. This isolated compound protected atrophy induced by Aβ (25-35) and displayed strong neurite outgrowth activity. The effect of this compound on the length of dendrite in the treated cells was comparable to those of nerve growth factor (NGF). Therefore, Rosa damascena may have the beneficial effect in patients suffering from dementia (Awaleet al., 2011).

Hypnotic A study was carried out to evaluate the hypnotic effect of the ethanolic and aqueous extract of *Rosadamascena* in mice in a dose of 500 and 1000 mg/kg respectively. The result

shows that a significant increase in phenobarbital induced sleeping time was noticed in comparison to diazepam (*Rakshanda* and *Hosseini*, 2006).

Mizaj (Temperament):

Unani physician Masihi described that the Mizaj of Gulab is cold 1^0 – Dry 1^0 (*Ibn Baitar, 2003*) while few others described it as Murakkabul Quwa *(Ansari, 2009).*

Musleeh (Corrective):

Habbul Zalam (Egyptian nut), Anisoon (Pimpinellaanisoon), Marzanjosh, and Honey are the correctives, Roghan Badam Shireen are used as corrective for the adverse effect of Roghan-e-Gul.

Badal (Proximal substitute):

Banafsha is used for Badal if Gule-e-Surkh unavailable while Roghan-e-Banafsha is used as a substitute of Roghan-e-Gul.

Identity, purity and strength:

Foreign Matter	-	Not more than 2%,	Appendix 2.2.2
Total Ash	-	Not more than 6%,	Appendix 2.2.3
Acid insoluble ash	-	Not more than 2%,	Appendix 2.2.4
Alcohol-soluble extractives	-	Not less than 20%,	Appendix 2.2.6
Water-soluble extractives	-	Not less than 33%,	Appendix 2.2.7

TLC behaviour of petroleum ether (60-80") extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Pet. Ether:Diehtyl Ether(9:1)	On spraying plate with5% Ethanolic conc. H_2SO_4	4	0.17, 0.50, 0.58, 0.64

Aa'maal-e-Adviya (Pharmacological Action):

Muqawwi-e-Aza-e-Raeesa, Muqawwi-e-Badan, Muqawwi Meda, Muqavvwi-e-Rahem, Oabiz, Mushil, Musakkin-e-Alam, Daf-e-Taffun, Daf-e-Jaraseem, Muqawwi-e-Quwwat-e-Mudafeyat.

Mahall-e-Istemalat (Therapeutic use):

Zof-e-Aza-e-Raeesa. Zofe-e-Badan, Nafs-ud-Dam, Khafqan, Ashob Chashm, Waj-ul-uzn, Qulah, Zof-e-Demaf, Asab-wa-Qalb, Zof-e- Quwwat-e-Mudafeyat.

Meqdar-e-Khorak (Dose): 5-7 gm

Muzir (Adverse effect):

Gul-e-Surkh and Roghan-e-Gul both have the adverse effect on baah (libido) (Abdul Hakim, 1999; Anonymous, YNM; Lubhaya, 1982).

Important formulations:

Khameera Abresham Arshad wala, Majoon Dabeed-ul Ward, Majoon Muqawwi-e-Rahem, Majoon Musaffi-e-Dam, Majoon-e-Ushba, Zuroor-e-Qula, Sufoof-e-Mushil,Sufoof Mulaiyin, Sufoof Chobchini, Araq Gulab, Raughan-e-Gul, Jawarish Tamar Hindi, Jawarish Zarishk, Itrifal Utukhuddus, Itrifal Shahtara.

GURMUR

(Stem and leaf)

.*Gymnema sylvestre* is a perennial woody vine that grows in tropical areas of India, Africa, and Australia and has been used for medicinal purposes. It is popularly known as "gurmar" for its distinct property as sugar destroyer, is a reputed herb in the Unani system of medicine. The phytoconstituents responsible for sweet suppression activity includes triterpene saponins known as gymnemic acids, gymnemasaponins, and a polypeptide, gurmarin. The herbal extract is used in dietary supplements since it reduces body weight, blood cholesterol, and triglyceride levels and holds great prospects in dietary as well as pharmacological applications. The leaves and extracts contain gymnemic acids, the major bioactive constituents that interact with taste receptors on the tongue to temporarily suppress the taste of sweetness.

Other names:

a. Botanical Name: *Gymnema sylvestre r.br*

b. Family: Asclepiadaceae

c. Bengali Name: Gudmaar/ Medha singi

d. English Name: Periploca of the wood

Description

a. General**:**The drug Gurmur consists of root of *Gymnema sylvestre R.Br belongs to family – Asclepiadaceae, a climber, much branched with pubescent young parts found throughout India and Bangladesh in forest upto 600 m.*

Fig: 35: Gurmur Leaf

b. Macroscopic: Tap root branched, rough, longitudinally fissured corky, soft and nodulose pieces, 2 to 7 cm long and 0.2 to 1.0 cm in thickness, external surface dark brown and cut surface showing a core cream in color; fracture, splintery; odour unpleasant; taste bitter and acrid.

c. Microscopic**:**Shows 5 to 20 rows of tangentially, elongated and radially arranged cork cells secondary cortex a wide zone consisting of oval to polygonal cells somewhat irregular in shape and moderately thick walled, filled with rosette crystal of calcium oxalate and a few simple or compound starch grains, ; secondary phloem composed of sieve tubes, companion cells and phloem parenchyma with mostly large and few small rosette crystals and starch grains, medullary rays prominent . uni or multi seriate, generally tetra seriate, extending from primary xylem to secondary phloem; groups of oval to elongated thick walled, lignified sclereids with clear striations and narrow lumen present in cortex and phloem region. Secondary xylem consists of usual lignified elements; vessels simple pitted; single or 2 to 7 in radial groups and dispersed throughout the xylem region; fibers long with tapering ends and wide lumen; primary xylem present diarch.

d. Powder: Light yellow; shows thick walled cork cells; polygonal, thin walled parenchymatous cells, simple pitted fibers and vessels groups of sclereids, large and few rosette crystals of calcium oxalate, simple and compound starch grains measuring 5 to 11 micron in India.

Parts used: Root

Habitat: India, Africa, Australiaand Bangladesh

Chemical Constituents: Seven compounds were isolated and their structures were elucidated as conduritol A, stigmasterol, lupeol, stigmasterol-3-*O*-β-D-glucoside, the sodium salt of 22α-hydroxy-longispinogenin-3-*O*-β-D-glucopyranosyl-(1→3)-β-*D*-glu-curono-pyranosyl-28-*O*-α-*L*-rhamnopyranoside, oleanolic acid-3-*O*-β-D-glucopyranosyl-(1→6)-β-D-glucopyranoside, and the sodium salt of 22α-hydroxy-longispinogenin 3-*O*-β-D-glucuronopyranosyl-28-*O*-α-L-rhamnopyranoside. The inhibition activities of compounds **1**, **5**−**7** on non-enzymatic glycation of protein *in vitro* were evaluated.

Afa'al-e-Adviya (Pharmacological activities): The herb exhibits a broad range of pharmacological activities for diabetes, besides being used for arthritis, diuretic, anemia, osteoporosis, hypercholesterolemia, cardiopathy, asthma, constipation, microbial infections, indigestion, and anti-inflammatory. G. sylvestre has good prospects in the treatment of diabetes as it shows positive effects on blood sugar homeostasis, controls sugar cravings, and promotes regeneration of pancreas.

The mode of action of the drug is through stimulation in insulin secretion from pancreas. It also exerts a similar effect by delaying the glucose absorption in the blood. The atomic arrangements of gymnemic acids to the taste buds are similar to sugar molecules which fill the receptors in the taste buds preventing its activation by the sugar molecule in the food. Similarly, in the intestine it attaches to the receptor present in external layer of intestine, thereby preventing the absorption of sugar molecules by intestine, leading to reduction in blood sugar levels. Gurmarin acts in a similar manner by interfering with the ability of taste buds on the tongue to differentiate between sweet and bitter. Hypoglycemic effect of gymnemic acids includes a cascade of events starting from modulation of incretin activity which triggers insulin secretion and release. It also increases regeneration of pancreatic islet cells to enhanced enzyme mediated uptake of glucose. This process decreased glucose and fatty acid assimilation in the small intestine and interferes in the ability of receptors in mouth and intestine to sensation of sweetness. It has been previously reported in the literature that the action of gymnemic acid is similar to that of incretin-mimetic mechanism of action. Gymnemic acid has been found to interact with glyceraldehyde-3-phosphate dehydrogenase (GAPDH), a key enzyme in glycolysis pathway. The findings also indicated that the acyl moieties present in gymnemic acids play important role for the GA-induced smearing of

GAPDH and G3PDH and play an integral role in the antihyperglycemic activity of GA derivatives

Mizaj (Temperament): Hot 2^o and Dry 2^o

Musleh (Corrective): No significant corrective measure is needed.

Badal (Proximal substitute): Telakucha leaf

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total ash	: Not more than 6 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 1 percent, Appendix 2.2.4.
Alcohol soluble extractives	: Not less than 5 percent, Appendix 2.2.6.
Water soluble extractives	: Not less than 14 percent, Appendix 2.2.7.

TLC: TLC of alcoholic extract on silica gel "G plate" using Toluene: Ethyl acetate (10:10:4) shows on spraying with Anisaldehyde-Sulphuric acid reagent and heating the plate for 10 minutes at 110^0C shows eight spots at Rf. 0.17 (brown), 0.25 (violet), 0.48 (grey), 0.57 (pink), 0.68, 0.80, 0.87 (violet) and 0.95 (pink). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Dafe sammiyat, Dafe Ziabetus Shakri and Mukhrize Balgham

Muhall-e- Istamalat (Therapeutic uses): Sammiyate Afyoon; Ziabetus Shakri

Meqdar-e-Khorak (Dose):5-7 gm

Side effects/ adverse effects: Excess use may cause Asthenia and depression.

Important formulations: Qurs Ziabit.Sufoof Gurmur

JAO

(Fruit)

Barley, a member of the grass family, is a major cereal grain grown in temperate climates globally. It was one of the first cultivated grains, particularly in Eurasia as early as 10,000 years ago.

Other names:

a. Botanical Name: *Hordeum vulgare* Linn; Syn *H. sativum* Pers.

b. Family: Poaceae

c. Bengali Name: Jav/ Barley

d. English Name: Barley

Description

a. General**:**The drug Jao consists of dried fruit of *Hordeum vulgare* Linn; Syn *H. sativum* Pers. An annual herb, 50-100 cm high, cultivated in North India and Bangladesh.

Fig: No 22: Jao (Jav)

b. Macroscopic**:**Fruit a caryopsis , elliptic, oblong, ovoid and tapering at both ends, smooth, about 1 cm long and 0.2-0.3 cm wide, dorsally compressed and flattened on the sides with a shallow longitudinal furrow, 3-5 ridges having shallow depression between them, grains tightly enclosed and adhering the lemma and pale-greenish yellow; odor no distinct; tase-sweetish-acrid.

c. Microscopic**:**Fruit shows single layered epidermis consisting ofcrescent shaped , round to oval wavy walled cells, followed by 2-3 layers, thick walled, sclerenchymatous fibers, below the sclerenchyma are present irregular , square or quadrilateral, spongy parenchymatous cells. Seed coat appears as a colorless line; perisperm composed of cells with more or less wavy walls having narrow lumen ; endosperm divided into two zones; 2-4 cells deep aleurone layers and the rest starch layers, starch grains simple, round to oval, measuring 3-30 i` in diameter.

d. Powder: Creamish-white; shows groups of fragments of polygonal; thin walled flowering glume cells in surface view, scleremchymatous fibers, scalariform vessels and abundant round to oval; simple starch grains; measuring 3-30 i` in diameter.

Parts used: Fruit

Habitat: Bangladesh and India

Chemical Constituents: Starch, sugars, Fat, protein (Albumin, globulin, Prolamin and Glutilin) also contain Flavone, Glycosides viz Orientosid, Orientin, Vitexin etc.

Afa'al-e-Adviya (Pharmacological activities): Lunasin, a novel, cancer-preventive peptide found in barley, internalizes into mammalian cells within minutes of exogenous application and localizes in the nucleus after 18 hours. It inhibits acetylation of core histones in mammalian cells. Lunasin does not affect the growth rate of normal and established cancer cells, but is selective for cells being transformed or newly transformed by binding to deacetylated core histones exposed by the transformation event, disrupting the dynamics of histone acetylation-deacetylation and leading to cell death.

Mizaj (Temperament): Cold & Dry

Musleh (Corrective) : Unknown

Badal (Proximal substitute): Jowar

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 4 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 2 percent, Appendix 2.2.4.

Water soluble Ash	: Not less than 4percent, Appendix 2.2.5.
Alcohol soluble extractives	: Not less than 2.5percent, Appendix 2.2.6.
Water soluble extract	:Not less than 5.5percent, Appendix 2.2.7.

TLC: TLC of alcoholic extract of the drug on silica gel "G plate" using n-Butanol: Acetic Acid: Water (4:1:5) shows under UV (366 nm) seven fluorescent zones at Rf 0.10, 0.22, 0.31, 0.45, 0.68, 0.83 (all violet) and 0.92 (yellow). On spraying with Phosphomolybdic acid reagent and heating the plate for 10 minutes at 105^0C shows six spots at Rf. 0.10, 0.22, 0.31, 0.68, 0.83 and 0.92 (all grey). On spaying with Ninhydrin reagent eleven spots appear at Rf 0.06, 0.14, 0.16, 0.24, 0.31, 0.36, 0.44, 0.53, 0.56, 0.65 &0.72 (all pink). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Qabiz (Constipation); Mujafiff (Siccative), Jali (Detergent); Dafe Tap (Antipyretic); Mudire Baul (Diuretic) and Muwwalid-e-Dam (Hematogenic).

Muhall-e- Istamalat (Therapeutic uses):Sil (Pthisis); Diq (Tuberculosis), Zatul Janb (Pleurisy); Sual (cough) and Suda (Headache).

Meqdar-e-Khorak (Dose):25-50 gm

Side effects/ adverse effects: No significant side effects has been observed.

Important formulations: Aash-e-Jao, Maus-Shaeer; Zimad-e-Waram-e Unsayain Haad.

KARANJWA

(Seed)

Caesalpinia bonduc (Linn.) is a wild highly thorny shrub. It is commonly called as the Gray Nicker, fever nut. The fruits are inflated pods, covered with prickles, about 7.5 cm long, 4.2 cm wide.

Other Names:

a. Botanical Name: *Caesalpinia bonduc* (Linn). Roxb.

b. Family: Caesalpiniaceae

c. Bengali Name: Nata Karanja

d. English Name: Bonduc Nut or Fever Nut

Description

a. General**:** The drug Karanjwaconsists of seed of *Caesalpinia bonduc* (Linn). Roxib belongs to Family –Caesalpiniaceae a wild perennial shrub widely distributed in India, Bangladesh.

Fig: No.3: Nata Karanja

b. Macroscopic: The seed of Karanjwa is globose or rounded, smooth, shiny, 1.2 to 2.5 cm in diameter; slightly flattened or one side due to close pressing of adjacent seeds; hilum and micropyle close together; hilum surrounded by dark area around 4 mm in diameter, usually with a whitish or yellowish remnant funiculus micropyle near the periphery of the dark area, seed coat greenish-grey to bluish grey; lineate, shiny; 100 seeds weigh from 225 to 250 gm.

c. Microscopic**:**Testa shows an outer single row of radially elongated, very narrow , translucent compactly arranged cells forming a palisade layer (Malphigian Layer) passing through which is the linea lucida. These cell appear hexagonal in surface view and possess thick wall (rich in pectin as evident from chloro-zinc iodine test); a sub-epidermal zone of 2-3 layers of thick walled bearer cells present, followed by multiple rows of osteosclereids which pregoressively increase in size, elongated laterally and have more intercellular spaces towards the inner side; the outer few layers of these osteoscereids contain a brown substance; laterally elongated vascular tissues present in the lower region of this zone. The cells inner to vascular elements gradually compacted and rounded towards the inner margin; cotyledons show an outer single layer of epidermis made of small, isodiametric cells and inner parenchymatous ground tissue cells rich in fixed oil and having empty cavities uniformly distributed in them.

d. Powder**:**Color light yellow through mustard to brown, coarse and free-flowing, bitter in taste and possessing tamarind like odor. Parts of vessels showing scalariform thichening and groups of narrow palisade cells with light line are present; groups of cells of heights from 150 to 250 micron the sub –epidemal layers of seed coat having 10 to 12 micron , suarish bearer cells and upto 150 micron osteoscereids ; cotyledon cells (upto 35 micron) showing fixed oil when mounted in Sudan III.

Parts used: Seeds

Habitat: Bangladesh and India

Chemical Constituents: Seeds contain bitter substance phytosterenin, bonducin, saponin, phytosterol, fixed oil, starch and sucrose. Seeds also cotain αβγδ and ζ caesalpins.

Afa'al-e-Adviya (Pharmacological activities): The plant has been reported to possess anxiolytic, antinociceptive, antidiarrhoeal, antidiabetic, adaptogenic, anthelmintic, antiestrogenic, anti- inflammatory, antimalarial, antimicrobial, antifungal, antispasmodic, antioxidant, antiproliferative, antipsoriatic, antitumor, larvacidal, muscle contractile, hepatoprotective, anticonvulsant and antifilarial activities.

Mizaj (Temperament): Hot 2^0 and Dry 2^0

Musleh (Corrective): Golmorich and Honey

Badal (Proximal substitute): Leaf of Nata karanja

Identity, purity and strength:

Foreign Matter	: Not more than 1 percent, Appendix 2.2.2.
Total Ash	: Not more than 5 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 1 percent , Appendix 2.2.4
Alcohol soluble extractive	: Not less than 26 percent, Appendix 2.2.6
Water soluble extractive	: Not less than 4 percent, Appendix 2.2.7.

TLC: TLC of the alcoholic extract on precoated silica gel "G plate"(0.2 mm thick) using Toluene: ethyl acetate:acetic acid (5:4.5:0.5) shows under UV (366 nm) spot of Rf. 0.13 (light blue) , 0.28 (dark blue), 0.63(pink), 0.92(pink) on spraying with anisaldehyde-sulpuric acid reagent and heating the plate for ten minutes at 110 ^{0}C spots appear at Rf.0.03 (yellow),0.64(bluish purple), 0.72 (purple), 0.80 (purple) and 0.89 (grey).

TLC of the hexane extract on percoated silica gel 'G plate 0.2 mm thick using chloroform: ethylacetate (98.2), on spraying with anisaldehyde-sulpuric acid reagent and heating the plate for ten minutes at 110 ^{0}C spots appear at Rf.0.03 (yellow), 0.11 (greenish blue),0.21 (greenish yellow) 0.33 (greenish blue), 0.43 (pale yellow) 0.43 (pale yellow), 0.55 (greenish blue). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Dafae Humma; Kasire Riyah; Mijaffif; Musaffie Khoon; Dafae Taffun; Qatile Kirm and Dafe Tashannuj.

Muhall-e- Istamalat (Therapeutic uses): Humma, Fasade Dam; Zeequn Nafas; Qoolanje Reehi.

Meqdar-e-Khorak (Dose) : 560 mg-1 gm

Side effects/ adverse effects: No significant side effect has been observed.

Important formulations: Habbe Mubarak; Jawarishe Gajga.

KATAI

(Whole plant)

Katai is also known as Solanum surattense or Indian Solanum. This is a herb which contains sharp spiny branches. Prickles are yellow in colour and they are very shiny. This herb is found all over Asia, especially in Bangladesh. The flowers of the plant are purple in colour and it has round shaped fruit. Its fruits are green and yellow in colour. The lant is bright-green in colour. The leaves are hairy and egg shaped. All the parts of the plant have medicinal value.

Other names:

a) Botanical name: *Solanumsurattense* Burm.f., Syn. *Solanumxanthocarpum* Schrad & wendl.

b) Family: Solanaceae

c) Bengali name:Kantakari

d) English name:Indian Solanum

Description:

a) General: The drug Katai consists of dried aerial parts of the plant of Solanum surattense Burm.f. Syn. Solanum xanthocarpum Schrad and wendl. (Solanaceae). A perennial herb found throughout Bangladesh as a waste land Weed. The plant occurs almost throughout the year. Flowering and fruiting take place during April to August.

b) Macroscopic: The drug sample composed of dried aerial parts of the plant at flowering and fruiting stage. The plant is very prickly bearing prickles on almost all parts. Leaves are petioled which are small and prickly. The prickles on the mid-rib as well as on veins. The flowers are violet in colour, bearing prickles on pedicel and calyx. The fruits are globose with persistent calyx.

c) Microscopic: A section of the petiole shows a single layered epidermis with line cuticle bearing prickles as well as stellate trichomes on the surface. The epidermis is followed by a zone of few layered hypodermis having collenchymatous cells which are pigmented Just below the epidermis. This is followed by a comparatively larger zone of parenchymatous cortex. A crescent shaped vascular bundle is present in the centre which has numerous strands of vessels and a lot of parenchyma.

A cross section of the lamina shows a central prominent mid rib and span of lamina on both the sides the lamina shows a single-layered epidermis covered with a fine smooth layer of cuticle.

A few simple epidermis trichomes are also seen on ataxial as well as abaxial surfaces. The cells of the epidermis layer are rectangular-square, rather small with slightly thick Walls. The mesophyll shows a dorsiventral structure. It is differentiated into a single layered palisade parenchyma and abaxial epidermal layer. The mesophyll cells are fully chlorenchymatous, stomatal openings are seen on both the surfaces.

Cross section of seed shows that it consists of a seed coat made up of sclereids having little parenchyma towards inside. This is followed by endosperm tissue having plenty of oil globules. The embryo occupies the major portion of endosperm which is visible as distinct circular zones. The cells of embryo and endosperm having dense protoplasmic contents.
Powder: The powder is not granular but appers fluffy and heterogenous; light greenish brown in colour. It gives a slightly spicy odour and is better in taste. Powder after clearing in chloral hydrate and observed under microscope shows a lot of 2-5 armed, simple, aseptate trichomes and fragments of throns. Portion of fruit surface with characteristic wrinkled marking and fragments of seed coat are also seen. Vascular strands show simple pits and spiral thickenings. Besides, a lot ofleaf and stem fragments are present.

Parts used: Whole plant

Habitat: Found throughout Bangladesh as a waste land Weed, The plant occurs almost throughout the year. Flowering and fruiting take place during April to August.

Phytoconstituents:
Steroids, terpenoids, alkaloids, tannins, glycosides & carbohydrates, iron, aluminum, calcium, magnesium, sodium and potassium.

Af'aal-e-Adviya (Pharmacological Activities):
Some of Af'aal-e-Adviya (Pharmacological activities) are describe here.
Pharmacology of Solanum surattense Solanum surattense have the several pharmacological activities, proved by scientific observations of experimental works. The bark, leaves, roots and fruits extensively used in traditional medicine due to the presence of several phytoconstituents like alkaloids, terpenoids, saponins, steroids and flavonoids. Scientific evaluations of isolated bio-compounds have ethnomedicinal and novel pharmacological effects.
Antibacterial activity: Many studies have been carried out with the aim of highlighting the capacities of plant extracts to prevent the growth of the bacterial organisms. Leaf extract of S. surattense exert the remarkable effect on bacterial strains. Sheeba (2010) reported a significant antibacterial effect of ethanol extracts of S. surattense leaf against eight bacterial strains, Staphylococcus aureus (11.23 mm), Streptococus (9.22 mm), Bacillus subtilis (16.25 mm), Escherichia coli (14.19 mm), Pseudomonas aeruginosa (4.16 mm), Salmonella typhi

(1.16 mm) Vibrio cholera (10.17 mm). No effect observed with Shigella dysentriea (Sheeba, 2010). Fruits extracts of S. surattense exhibited potential effect in preventing the following bacterial strains, Minimum and maximum zones of inhibition observed with Micrococcus luteus (3.6, 12.7 mm) S. aureus (3.9, 14.0 mm) E. coli (8.6, 17.8 mm), S. typhi (6.5, 15.7 mm), M. varians (7.4, 10.3 mm) Pasteurella multifida (12.5, 20 mm) V. cholera (0 mm) (Abbas et al., 2014). Antibacterial efficiency of plant extracts was similar to the efficiency of standard drug ampicillin. Previous studies have reported that the antibacterial activity of S. xanthocarpum leaves against the five bacterial stains such as P. aeruginosa, S. typhi, S. aureus, E. coli, and Corynebacterium diphtheria (Nithya et al., 2018). Among the solvent extracts, ethyl acetate extracts exhibit moderate and broad spectrum activity against P. aeruginosa (8 ± 1.2 mm) and S. aureus (7 ± 1.0 mm), respectively, and does not show inhibitory activity for S. typhi. Other solvent extractions, such as chloroform, hexane and acetone exhibited that the very least antibacterial activity against the S. aureus, P. aeruginosa, and C. diphtheriae.

Antifungal activity: Solanum surattense extract are evaluated for antifungal effectiveness and a wide range of zone of inhibition has been evidenced against many of the fungal stains such as Trichoderma viride, Aspergillus niger, A. flavus, and A. Fumigatas. Singh et al. (2007) reported antifungal efficiency of isolated steroidal glycosides (carpestroal) on T. viride and A. niger. Trichoderma viride exhibited the highest susceptibility and showed the highest growth inhibition antifungal effect of plant extracts were similar to that of standard drug amphotericin-B. In comparison with the fruit extracts, it is less than the effect of standard drug because of the low dose of antifungal components. Antioxidant activity Antioxidants are capable of damaging the reactive oxygen species (ROS), that cause oxidative damage. Free radicals react with the bio molecules like DNA, proteins lipids and produce the toxic effects. So far, a large number of plants reported to possess anti-oxidant potential due to rich phytochemical constituents like phenols and Flavonoids. Yadav et al. (2014) reported the total phenolic and flavonoid content from leaf [25.91 gallic acid equivalent (GAE)/mg b.w] [17.7 Quercitien (QE)], stem (5.879 GAE/mg b.w) (3.129 QE), and fruit (4.975 GAE/mg b.w) (5.208 QE) phenol quantity expressed as GAE and flavonoid content as Quercitien. The leaf contains high quantity of phenols and flavonoid than the stem and fruits. Muruhan et al. (2013) evaluated the ROS scavenging efficiency of S. surattense leaf extracts against 2,2-diphenylpicrylhydrazyl scavenging activity, revealed that the plant extract exhibited remarkable antioxidant activity at all test doses in a dose-dependent manner. Fruit extracts also reported to possess appreciable amount of radical scavenging activity

(about 80%) at the lowest test conc. (250 µg/ml). No enhanced activity was observed at increased test dose conc. 500 and 1,000 µg/ml, due to saturation effect (Rehman Shah et al., 2013). Similar findings also noticed from anti-oxidant studies of S. surattense fruit extracts (Kumar and Pandey, 2014). Poongothai et al. (2014) reported that S. surattense leaf extracts enhanced the level of anti-oxidant enzymes catalase (CAT), superoxide dismutase (SOD), and glutathione (GSH) peroxidase in alloxan-induced animal models. Plant extracts increased the anti-oxidants to normal level and the efficiency was similar to standard drug glibenclamide. Remarkable anti-oxidant potentiality of S. surattense leaf extracts might be attributed to the presence of phenolic and flavonoids compounds in high quantity (Poongothai et al., 2014). All these findings confirm S. surattense to be an ideal choice to pursue the further exploration in developing the effective natural anti-oxidants.

Mosquito larvicidal effect: Mosquito larval diseases such as malaria, dengue, filariasis, yellow fever, and Japanese encephalitis are prevalent in the tropical countries. The concentration of large number of mosquito vector species in the tropical region increases the risk to affect from the above diseases. The control of mosquito born disease such as malaria is becoming increasingly difficult, because of development of resistance in mosquitoes made the vector control strategy ineffective. Application of chemical and synthetic larvicides to control the larval vectors resulted in thedevelopment of insecticide resistance and adversely affects the environment by contaminating the soil, air and soil due to their hazardous and persistence properties. Environmental degradation, bio magnification, and increased resistance in mosquitoes for dichloro diphenyl trichloroethane are a well-known fact. Most efficient approach is to control the mosquito vectors during the stage of larval development. Nature has given the plants, which destroys the mosquitoes during larval stage. Bansal et al. (2009) reported the larvicidal efficiency of S. surattense fruit extracts against four vector species such as Anopheles culifacius, Anopheles stephensi, Aedes aegypti, and Culex quinquefasciatus. Anopheles sps are the important vectors of malaria, whereas A. aegypti cause dengue and Culex cause filariasis. Anopheles culifacius showed more susceptibility, followed by A. Stephensi, A. Aegypti, and C. quinquefasciatus. Among the extracts of different parts like whole fruit, seeds, and fruit without seeds, seed extracts exhibited potential larvicidal efficiently followed by whole fruit and the least by fruits without seeds (Bansal et al., 2009). Mohan et al. (2005) reported that, along with the fruits, the roots of S. surattense also effective against larvae of A. Stephensi and Culex sps. Subsequent studies carried out by Mohan et al. (2007) synergistic effect of S. surattense root extract and synthetic pyrethroid cypermethin in 1:1 ratio exhibited the highest mosquito larvicidal

efficiency than the other test ratios 1:2 and 1:4. Previous study with root extract of S. surattense confirmed the mosquito larvicidal property and its efficiency further enhanced by the cypermethrin due to synergism. Similar studies carried out by Bansal et al. (2015) reported that the synergetic efficiency of the S. surattense and Withania somnifera against the larval vectors of three mosquito vector species like A. stephensi, A. aegypti, C. quinquefasciatus. Among the three, A. stephensi was more susceptible to the test ratio 1:3 Ws: Ss. Individual extracts, S. surattense had shown more effectivenessas compared with the W. somnifera with all three vector species. The larvicidal efficiency was higher with increased in proportion of S. surattense and get decreased with increase in proportion of W. somnifera extract (Bansal et al., 2015). Leaf extract of S. surattense also reported to possess larvicidal efficiency against C. Quinquefasciatus (Mahesh Kumar et al., 2012). Hence, from the above findings, it was clear that S. surattense possess individual and synergetic mosquito larvicidal efficiency. These studies considered to be of great importance in notifying the potential larvicidal compounds from the natural source.

Antimalarial activity: Emergence of malaria in many parts of world due to the development of resistance of vectors. Availability of the antimalarial drugs also associated with some side effects because of its synthetic chemical nature. This necessitates searching the safe and effective antimalarial drugs alternative to the existing ones (Antony and Parija, 2016). Traditional medicinal knowledge yields the anti-malarial drugs like quinine and artemesin and their efficiency to control the malaria, stimulated many researchers to find the similar potential anti-malarial drug from the plant sources (Pulice et al., 2016). Ramazani et al. (2010) reported that S. surattense possess anti-malarial activity. Solanum surattense extract exhibited antiplasmodial activity with an IC50 = 50 µg/ ml on K1 strain (Plasmodium falciparum resistant), IC50 = 40.88 µg/ml on chloroquine-sensitive strain (Chloroquine-sensitive). Recently, Kaushik et al. (2015) reported that the antiplasmodial activity of S. surattense aerial part extraction (ethyl acetate) against the P. falciparum. Accordingly, the IC50 of P. falciparum 3D7 strain was showed 17 µg/ml and Indonesia strain of P. falciparum strain showed 7 (0.41) µg/ml values. In addition, the cytotoxicity (TC50 µg/ml) of S. surattense showed 75 (10.7) µg/ml against HeLa cell lines.

Antihelmenthic activity: Priya et al. (2010) evaluated the antihelmenthic activity of S. surattense whole plant crude aqueous, hydroethanolic, and ethanolic extracts at 25, 50, and 100 mg/ml conc. in distilled water. Piperazine citrate 10 µg/ml used as a reference standard. The study revealed ethanolic plant extracts (100 µg/ml conc.) showed the remarkable antihelmenthic property than aqueous and hydroethanolic extracts. Barik et al. (2018) noticed

similar findings on the antihelmenthic efficiency of S. surattense fruit ethanolic and aqueous extracts.

Anti-asthamatic activity: Asthma, a chronic inflammatory disease affects airway by obstruction, eosinophilia, and bronchial hyper responsiveness (Zanini et al., 2015). Asthma became a global health problem result from a complex interaction between genetic and environmental factors. Use of bronchial dilators and steroidal inhalers, the effectiveness is only limited to mild-to-moderate asthma. However, the use of steroidal related medications has not been right solution because some adverse effects are also associated with that. Literature reveals many plants are reported to have welldefined anti-asthmatic agents and for some agents, the possible anti-asthmatic mechanism was explored. In search of safe and effective medicine from the plants to cure asthma, S. surattenseconsidered as the right choice, because of long usage in Ayurveda and siddha as effective to cure respiratory disorders (Babu et al., 2009). Anti-asthmatic efficiency studies on S. surattense flower extracts revealed that the presence of anti-histamine and mast cell stabilizing efficiency.

Clinical studies: Shirishadi, a polyherbal drug used to treat asthma, S. surattense forms one of the important constituent. Clinical studies on 60 bronchial asthmatic patients resulted that significant improvement in pulmonary expiratory flow rate (PEFR), forced vital capacity (FVC), and forced expiratory volume (FEV). A constant change was observed throughout the follow up, no resume of bronchial constriction. Clinical trials proved that antiasthmatic potentiality of polyherbal drug for the management of asthma (Divya et al., 2013). Govindan et al. (1999) studied the clinical efficiency of S. surattense on bronchial asthma, by the administration of single dose (300 mg) to the patients suffering from mild-to-moderate asthma, resulted that relief from asthmatic symptoms were observed after 1 hour and its effect lasted for about 6–8 hours. Potentiality of the plant extracts was evidenced in values of PEFR, FVC, FEV, and forced expiratory flow confirm the improvement of the pulmonary function. The anti-asthmatic response observed for S. surattense is apparently less than compared with that of standard bronchodilator drug Salbutanol and deriphillin. No untoward effects noticed during the study. The low response of the S. surattense extracts due to the crude form of drug or less effective dose. Administration of plant extract for 3 days resulted in the progressive improvement in respiratory function of asthmatic individuals. Significant improvement in PEFR and the reduction of other symptoms like cough, breathlessness, and the formation of sputum clearly indicate its potential bronchodilator effect. The effective response exhibited by plant extracts was equivalent to that of standard drug deriphylline, but

less than salbutamol. Clinical studies confirm the traditional use of S. surattense in bronchial asthma.

Accordingly, S. surattense has been defined as the ideal candidate for the modern medicine towards asthma.

Anti-cancer activity/apoptosis: Plants serve as an excellent source of anticancerous drugs. The success of plant-based anti-cancerous drugs like vinblastine, vincristine, podophyllotaxin, and campothecins… etc. inspires the researchers to continue the search for new anticancerous agents from plants. Anticancerous efficiency of S. surattense further widens the pharmacological properties. The anti-cancerous efficiency of S. surattense due to the presence of secondary metabolites of Lupeol, apigenin, solamargine and diosgeninas. Solamargine, a steroidal alkaloid possess antitumor effect (Burger et al., 2018). Kuok et al. (2000), tested the anticancerous property of solamargine (glycoalkaloid) on human hepatoma cells (Hep3 cells). Two hours incubation with a constant concentration of solamargine triggered the apoptosis of maximum number of Hep3 cells. Cells in G2 /M phases are relatively susceptible to apoptosis mediated by solamargine. The possible mechanism of solamargine-mediated apoptosis is due to up regulation of tumor necrosis factor (TNF) receptor-I and II on Hep3B cells. TNF-I or II specific antibody neutralizes the cytotoxicity mediated by solamargine strengthened the underlying mechanism of solamargine-mediated apoptosis of He3B cells. Kumar and Pandey (2013) evaluated the anticancerous efficiency of fruit extract of S. surattense on human lung cancer cell lines (HOP-62) and leukemic (THP-1) cell lines. Non-polar extracts (hexane, benzene, chloroform, and ethyl acetate) exhibited potent anticancer activity against THP-1 cell lines (85%–90% growth inhibition). Chloroform and benzene fractions accounted for about 70% cytotoxicity against lung cancer cell lines (HOP-62). The anticancer efficiency of S. surattense of fruit extracts on THP-1 cell lines established a positive correlation between flavaniod content and percentage of growth inhibition in cell lines. Anticancerous efficiency of S. surattense fruit extracts might be attributed to the presence of flavanoids such as apiginene, quercitien, fisatin, and luteolin, which known to be the potent inhibitors of cancer cell proliferation (Kumar and Pandey, 2014). Solamargine and solasodine are cytotoxicity to Hep 2 B cells of 10 µm (Cham, 2017). Diosgenin exhibited apoptosis activity on HCT 116 cell lines (Human colon carcinoma cell lines) (Sethi et al., 2018). The apoptotic efficiency was weak by comparison to the standard drug cisplatin (Bhutani and Paul, 2010). The presence of 2- rhamnose moiety of solamargine and solasonine was essential for apoptosis induction. Solasodine and diosgenin, do not contain carbohydrate moieties, were only weakly cytotoxic. These findings of the study

confirm the apoptosis inducing activity and to cause cell death, by the steroidal constituents from S. surattense. Thorough systematic investigations required to understand the detailed mechanism of inducing apoptosis and cell death, to develop the potential therapeutic drug to overcome cancer.

Anti-HIV activity: Kumar and Pandey (2014) reported that the fruit extract of S. surattense possess anti-reverse transcriptase (RT) activity. Non-polar extracts (hexane, benzene, chloroform, ethyl acetate, and acetone) and aqueous extracts at dose 0.6 and 6.0 µg/ml are tested to evaluate the anti-RT activity. Results revealed that nonpolar extracts showed that dose-dependent inhibitory activity. Benzene and acetone extracts at 0.6 µg/ml conc. exhibited the highest (20%) percentage of RT inhibition, whereas extracts at 6 µg/ml conc., benzene exhibited the highest (25%) percentage of RT inhibition followed by hexane (20%) and chloroform (15%). However, the fruit extracts (non-polar) of S. surattense showed lower percentages of RT inhibition with reference to the standard drug Nevirapine.

Analgesic activity (reducing the tooth pain): Panday (2004) reported that seed fumes of S. surattense used for the treatment of tooth pain and pain from gingival swellings. Trials done on patients suffering from dental caries, pain, and pus formation, 75% of them completely cured after 3–4 hours. Effective results find in patients suffering from dental caries associated with severe swelling and pain. Vijay Amirtharaj et al. (2015) reported that, experimental studies on 50 patients suffering from dental problems such as pulpitis, treated with mouth rinse solution (single dose) made from S. surattense seed extracts. Test results showed 68% of the patients in the experimental group, got the relief after the treatment. These findings confirm the efficiency of S. surattense seeds to curecertain ailments like dental caries, swellings, and tooth pain and considered to be an alternative and safe medicine to cure the dental problems.

Anti-inflammatory activity: Inflammation is a complex set of interactions between cells and soluble factors that arise in the tissues in response to the infection, trauma, or injury. Inflammation is one of the major constraints results in human diseases like heart disease and diabetes. The choice of non-steroidal and steroidal drugs has side effects. This necessitates searching safe anti-inflammatory agents from the natural source. Fruits of S. Surattense are used as anti-inflammatory agents used in the traditional medicine. Investigation of anti-inflammatory efficiency of S. surattense extracts on inhibition of paw edema in animal models revealed that only moderate inhibition was observed (Ramanarayana Reddy et al., 2014). However, the contrary findings observed from the studies of Anwikar and Bhitre (2010) Synergistic antiinflammatory effect of S. surattense was also observed with Cassia

fistula (1:1 combination), the efficiency was slightly less (75%) than compared with that of the standard drug Diclofenac sodium (81%), but individually it is 66.41% with S. surattense. Isolated steroidal compounds from S. surattense, stigmasterol, carpesterol, and diosgenin also reported to possess anti-inflammatory activity. Among the three, diosgenin found to possess remarkable antiinflammatory efficiency.

Antidiabetic activity: Prevalence of diabetes throughout the world necessitates the in-search of new, effective, and anti-diabetic drugs than the existing ones. Extensive research going on along these lines and reported many plants have to possess a wide range of antidiabetic compounds, among the reported ones S. surattense possess prominent anti-diabetic potentiality equal to the standard drug Glibenclamide. Leaf extracts of S. surattense effectively lowered the blood glucose levels and increased the level of insulin (Poongothai et al., 2014; Sridevi et al., 2007). Antidiabetic studies validate the traditional use of S. surattense fruits by the folklore as an anti-diabetic agent. Comparative studies in the field and in vitro grown S. surattense plants for antidiabetic activity. Poongothai et al. (2014) noticed that remarkable anti-diabetic efficiency of in vitro grown plants compared with the field grown plants. Availability of the rich source of mineral nutrients during culture conditions, rendered the plants rich in phytochemical, resulted in exhibiting high potential. These findings enabled the use of in vitro techniques to raise the plants, which provide the source of therapeutic drugs with high potentialities (Poongothai et al., 2014). β-Sitosterol, a phytosterol from S. surattense also reported to possess anti-diabetic properties. A study carried out for duration of 21 days in experimental animal models resulted that increased level of serum insulin was observed in β-Sitosteroltreated group than compared with the normal ones. The pancreatic protein content estimation, normal in the treated group (diabetic induced), but enhanced level of pancreatic protein observed in normal ones (Control) in a dose-dependent manner. The level of anti-oxidants lipid peroxide, GSH peroxidase, GSH, SOD, and CAT of pancreatic tissue were significantly increased inβ-Sitosterol-treated group. These findings confirm the protective role of S. surattense extracts in preventing from the effects of diabetes induced oxidative damage (Gupta et al., 2011a).

Hepatoprotective activity: Hepatic diseases are one of the most serious and common diseases to the mankind. Pathogenesis of the hepatic diseases, due to the oxidative stress and inflammation. Despite, tremendous advances in the modern medicine, the management of liver disease is still a major challenge. Solanum surattense fruits used as a traditional medicine to treat the disorders of the liver. Investigations of hepatic protective nature of S. surattense leaf and fruit determined its potentiality as an effective hepatic agent.

Hepatotoxicity induced by carbon tetrachloride (CCl4) resulted the necrosis of hepatic cells and increased the level of serum marker enzymes [aspartate aminotransferase (AST), alanine aminotransferase (ALT), and alkaline phosphatase level (ALP)]. Administration of the fruit extract at dose 400 mg/kg showed a significant effect on lowering the serum marker enzymes AST (67.71), ALT (75.66), and ALP (54.52). Reduction in the level of serum marker enzymes with plant extracts was similar to the effect of standard drug Silymarin AST (70.31), ALT (77.40), and ALP (59.80) (Gupta et al., 2011b; Jalali Ghassam et al., 2014). Singh et al. (2015) noticed the similar findings of S. surattense fruit extracts against paracetamol and azithromycin induced hepatic injury. Leaf extracts, at low test dose (100, 200 mg/kg), resulted in a marginal increase of CAT, SOD, and GSH enzymes, whereas a higher dose restored the level of anti-oxidant enzymes. Solanum surattense extracts offered the hepatic protection, by reducing the oxidative stress induced by CCl4. These findings support the use of S. surattense fruits as a traditional medicine.

Antiulcer activity: Investigations on antiulcer potentiality of S. surattense leaf extracts by Bahuguna et al. (2008) revealed that alcoholic extracts exhibited significant antiulcer property than other solvent extracts. Plant extract raises the pH (3.10) of gastric contents and lowered the total acidity resulted in decrease of ulcer index. The antiulcer efficiency of S. surattense was comparable to the effect of standard antiulcer drug Omeprazole in lowering the acidity. Omeprazole exhibited pronounced effect in decreasing the ulcer index than the plant extracts. The lowered efficiency of plant extracts due to less quantity of anti-ulcer agents in crude form (Bahuguna et al., 2008).

Wound healing activity: Wounds (Physical injuries) and wound infections are the most common diseases overcome by wound healing. Wound healing restores the disturbed anatomical continuity and normalizes the epithelial integrity of the skin (Gonzalez et al., 2016). Many plants used as a remedy for wound healing, in traditional system of the medicine. Investigations on the wound healing property of various plants led to the discovery of a large number of wound healing agents from plants. Inquisitiveness to develop effective wound healing agents continued to screen many medicinal plants, used in traditional system of medicine. Solanum surattense fruit poultice used traditionally for wound healing (Kumar et al., 2010). Dewangan et al. (2012) reported the S. surattense extract (ethanol)exhibited pronounced wound healing activity than compared with other solvent extracts. Reduction in epithelisation, time, and scar area in test group due to increased hydroxyproline content and high tensile strength, which is an indication of quality of wound healing. The wound healing efficiency of plant extracts was similar and comparable to the efficiency of standard drug

Sulphadiazine. This study provides a scientific support on the account of S. surattense use as a traditional wound healer. To use S. surattense, active principles in modern medicine need further investigation for isolation and to carry out biological tests to confirm the role of specific compounds in wound healing.

Diuretic activity: Investigations of Ahmed et al. (2016) on diuretic and serum electrolyte regulation properties of S. surattense fruit extracts revealed that fruit extracts significantly increased the urine output in a dose-dependent manner. The diuretic potentiality of plant extract was slightly less than compared with the efficiency of standard drug furosemide (Ahmed et al., 2016). Fruit extract exhibited the diuretic activity by increasing the osmolality of urine together with excretion of electrolytes, due to the presence of phenolic caffeic acid and methyl caffeates as secondary metabolites (Patel et al., 2012). Regarding the serum electrolytes, fruit extracts reduced the level of sodium, potassium, and calcium whereas serum bicarbonates concentration was increased in a dose-dependent manner. Treatment with fruit extracts result a substantial decrease in blood urea nitrogen and Ca2+ proved its diuretic potential. Similar findings noticed with leaf extracts by Ramanarayana Reddy et al. (2014) strengthen the diuretic efficiency of S. surattense extracts.

Anti-hyperlipedemicactivity: Total cholesterol, Triglycerides, Phospholipids, and free fatty acid levels in plasma are the significant biomarkers, to assess the hyper or hypolipidemic. Sridevi et al. (2011) carried out the biochemical studies on strepptozotocin induced experimental animal models. very low-density lipoprotein cholesterol and lowdensity lipoprotein cholesterol levels increased and high-density lipoproteins cholesterol levels decreased, reflects the altered lipoprotein profile. Animal models treated with S. surattense plant extract normalized the plasma lipid profile than compared with control group (without treatment). The anti-hyperlipedemic potentiality of S. surattense was equal to the effect of standard drug Glibenclamide (Sridevi et al., 2011). This study confirms the potential ability of S. surattense, as anti-hyperlipedemic agent and provides a scientific rationale for the use of S. surattense for the development of effective medicine to combat diabetes and its associated effects on body metabolism.

Analgesic activity: Solanum surattense leaf extracts have the potential capability to use as an analgesic. Studies in experimental animals with plant extract showed an elevated response in the dose-dependent manner. This investigation authenticates the traditional use of S. surattense as analgesic and provides the scope to develop natural analgesics from the folklore claims (Huque et al., 2015).

Anti-urolithiatic activity: Urinary calculi are the most prevalent disorder of the urinary system. Urinary calculi formed from the oxalates of calcium, phosphates, etc. affect the renal function and decreasing the glomerular filtration rate due to obstruction to the flow of urine (Alelign and Petros, 2018). A large number of plants are used to cure urinary calculi, since from ancient times. Ancient literature Ayurveda describes the traditional use of S. surattense for the treatment of urolithiasis. Chauhan et al. (2009) reported the ethnopharmocological use of S. surattense for the treatment of urinary track and kidney stones in Muzaffarnagar, U.P (India). Experimental models treated with ethylene glycol for a period of 28 days resulted, the increase in excretion of Ca2+, phosphate, uric acid and a decrease in citrate and magnesium content in urine due to impairment of renal function. Treatment with S. surattense extracts improved the renal function by its potential effects like diuretic; anti-oxidant reduced the Caox crystal formation. The decreased levels of Ca2+ and uric acid was evidenced in plant extract treated group indicates the improvement of renal function and confirms its antiurolithiatic role. Similar studies with saponins rich fraction of S. surattense fruits resulted that, less number of calcium oxalate crystals and their aggregation in plant extract treated group. Plant extract prevents the formation of calcium oxalate crystals as well as their aggregation (Patel et al., 2012). The anti-urolithiatic efficiency was slightly less compared with the standard drug Cystine. This study confirms the use of S. surattense fruits for urolithiasis as effective medicine.

Cardio-protective activity: Pullaiah et al. (2015) studied the cardio protective efficiency of S. surattense extracts against Isopropanol induced myocardial injury in animal models. Enhanced level of marker enzymes lactate dehydrogenase (LDH) and creatine kinase-muscle/brain (ck-MB) is observed in plasma of myocardial injured animal models. Isopropanol induced myocardial injury is mediated via the β- adrogenic receptor. Acute β-adrogenic receptor stimulation rapidly generates ROS and also depressed the total anti-oxidant capacity. Treatment with plant extracts showed significant cardio protection in a dose-dependent manner with reference to the standard drug propanol. Potapovich et al. (2012) and Witaicenis et al. (2013) reported the presence of seven kinds of flavonoids and coumarins like esculentin. Esculentin is particularly well proven anti-inflammatory and anti-oxidant activity, which plays a prominent role in healing of myocardial injury. Elevated levels of serum cardiac markers like LDH and cK-MB are drastically reduced because of the presence of cardio protective agents of S. surattense. The cardio protective mechanism of S. surattense appears to be through improvement of overall anti-oxidant defense mechanism of

cardiac tissue. Increased anti-oxidant defense mechanism was evidenced, in thelevel of anti-oxidants like GSH, SOD, and CAT in animal models treated with plant extract.

Antifertility activity: Research studies on S. surattense reported to possess excellent antifertility activity. Administration of fruit extracts at dose 0.5 mg/kg for duration of 60 days to experimental animal models resulted that arresting the process of spermatogenesis. It was also evident that reduced number of primary and secondary spermatocytes and spermatids correlated with arresting of the spermatogenesis. In testis, leading cells were also significantly decreased, confirms the antispermatogenic nature of S. surattense fruit (Purohit, 1992).

The S. surattense seed extract also reported to possess antifertility efficiency by depleting the oxidative potential of cauda epididymal spermatozoa. Administration of the seed extract at the dose of 10 mg/kg b.w to experimental animal models for a period of 15 days resulted significant decrease in the level of AST, ALT, glutamate dehydrogenase, Citric acid, and Isocitrate dehydrogenase was observed. Sperm motility was also decreased in the animal model group treated with plant extract. Decreased oxidative potential in the cauda epididymal spermatozoa indicates the antifertility effect of S. surattense seeds (Thirumalai et al., 2012).

Dixit and Gupta (1982) reported the anti spermatogenic property of solasodine, an alkaloid found in S. surattense fruits. Administration of solasodine at 20 mg/kg to experimental animal models for the duration of 30 days resulted that testicular lesions and severe impairment of spermatogenesis. Analysis of biochemical like total protein, sialic acid, and glycogen contents of the testis and epididymis were significantly reduced, whereas the level of testicular cholesterol was increased. Administration of solasodine to castrated dogs, failed to stimulate the epididymal growth. Treatment with solasodine on experimental animals (dogs) affected the male fertility by affecting the androgenesis. Absence of sperms in the cauda epididymis and ductus defens rendered the male infertile. The findings of these investigations confirm the antifertility role of S. surattense fruit and seed extracts.

Fertility activity: The post-menopausal syndrome is characterized by low estrogen levels, leading to sexual dysfunction, vaginal dystrophy, and osteoporosis. Solanum surattense is reported to possess fertility activity by promoting conception in females. Studies on postmenopausal ovariectomized animal models by the administration of S. surattense extract at doses 200 and 400 mg/ kg for duration of 90 days resulted that increased serum estradiol content, vaginal cornification and uterine weight. Fertility effect was similar to the effect of standard drug β-estradiol. At doses200 mg/kg exhibited the potent estrogenic activity, but at higher doses it induces negative feedback inhibition (Aswar et al., 2014). These findings

suggest the potential ability of S. surattense in preventing the post-menopausal symptoms associated with estrogen deficiency by promoting the estrogen levels.

Antinociceptive activity: Rahman et al. (2003) studied the antinociceptive activity of S. surattense on experimental animal models. Methanol extracts of S. surattense significantly suppressed the frequency of acetic acid induced abdominal constrictions in animal models. At dose 500 mg/kg reduced the frequency of worthiness and showed the 73.08% inhibition. S. surattense exhibited the antinociceptive efficiency in a dose-dependent manner.

Mizaj (Temperament): Hot 2^0- Dry 2^0

Musleeh (Corrective): Not require.

Badal (Proximal substitute): No proximal substitute is identified.

IDENTITY, PURITY AND STRENGTH:

Foreign Matter	- Not more than 2%, Appendix 2.2.2.
Total Ash	- Not more than 19%, Appendix 2.2.3
Acid insoluble ash	- Not more than 7%, Appendix 2.2.4.
Alcohol-soluble extractives	- Not less than 6%, Appendix 2.2.6.
Water-soluble extractives	- Not less than 15%, Appendix 2.2.7.

TLC behaviour of petroleum ether (60-80^0) extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Benzene: Chloroform (4:1)	I_2 vapours	5	0.25, 0.34, 0.44, 0.71, 0.81

Aa'maal-e-Adviya (Pharmacological Action):

Mudirr-e-Baul, Munaffis-e-Balgham, Muhallil-e-Waram, Kasir-e-Riyah

Mahall-e-Istemalat (Therapeutic use): Sual, Nazlah, Zeq-un-Nafas

Meqdar-e-Khorak (Dose): 1-2 gm

Side-effects / Adverse-effects: No significant side effects have been observed.

Important formulations: Sufoof-ul-Amlah

KHAYAR

(Seed)

An herbaceous annual and widely cultivated plant in Asia, Africa and in all warm countries. The plant is primarily grown for its fruit which is eaten while still immature either fresh or cooked. On bisexually flowered plants the male flower buds are better removed before anthesis to prevent pollination. The fruit juice is slightly purgative and diuretic. A small amount of ascorbic acid is present. It is a good source of vitamins B, C and G and of iron and calcium.

Other Names:

a. Botanical: *Cucumis sativus* (Linn).

b. Family: Cucurbitaceae

c. Bengali Name: Kheeraa/ Shashaa

d. English Name: Cucumber

Description

a. General**:** The drug Khayar/shashaa seed consists of seed of *Cucumis sativus* (Linn).linn)belongs to Family-Cucurbitaceae an annual trailing or climbing plant, numerous varieties widely cultivated throughout Indian subcontinent, Africa and all over the world. The seeds are devoid of mucilaginous outer layer.

Fig: No.4: Shasha fruit and seed.

b. Macroscopic**:** Seeds compressed, elongated, ellipsoid, dorsiventrally convex and laterally ridged size variable about a cm or occasionally more length and up to 0.50 cm wide. Microphyle pointed, distinctly visible, outer surface glossy, brittle, peeable, yellowish-white, kernel, oily, creamish-white, taste, mildly sweet, oily; not slippery to touch when moistened; odour-nil.

c. Microscopic**:** Outermost layer of testa absent; hypodermis scelerenchymatous, two layered; outer layer is small circular; stone cell; inner layer is large, oval thick walled, striated, lignified sclereids placed at right angle to outer layers, a large zone of aerenchyma filled with loosely packed parenchymatous cells, cotyledon lined by compact layer of cuticularized thin walled epidermis, cotyledon of several layers of elongated, closely packed parenchymatous cells, largely hexagonal, packed with aleurone grains, starch and fat globules; inner most two layersmuch more elongated, palisade like and distinct, each cotyledon shows five distinct patches of small, thin walled, polygonal cells present midway, in a roughly trapezial shape.

d. Powder:Creamish white to light green, oil, shows groups of yellowish, wavy –walled sclereids from testa in surface view, also isolated ones; fragments of parenchymatous cells, annular or spiralxylem vessels in groups; abundant oil globules, aleurone grains and starch grains.

Parts used: Seeds

Habitat: Indian Subcontinent, Africa and tropical countries

Chemical Constituents: Fixed oil and sugars; 22.3% linoleic acid, 58.5% oleic acid, 6.8% palmitic acid and 3.7% stearic acid.

Afa'al-e-Adviya (Pharmacological activities):

Anti bacterial activity: Ankita Sood et al was conducted the antimicrobial activity of *Cucumis sativus***(CS)**against 4 human microbial pathogens. Antimicrobial assay was performed by Agar well diffusion method. Specific concentration of seed extract was showed highest zone of inhibition against *S. aureus*. These pathogens were highly sensitive to the methanol extract also except *E. coli* (enteropathogen) and *P. aeruginosa*.

Antifungal activity: Ankita Sood et al was conducted the antifungal activity of CS**a**gainst two potent fungus .Finally they concluded that CS possesses potential antifungal activity.

Jony Mallik et al was performed an study on the antifungal activity of the ethanolic extracts of *Cucumis sativus*.The antifungal potentials of the ethanol extract of *cucumis sativus* Linn. (30µg/disc) were assessed against six fungus. The results (diameter of zone of inhibition) were compared with the activity of the standard drug, Griseofulvin (30µg/disc). At 80µg/disc, the ethanol extracts of *Cucumis sativus* Linn.

Cytotoxic activity: Jony Mallik et al were performed a study on the cytotoxic activity of the ethanolic extracts of *Cucumis sativus*. In brine shrimp lethality bioassay, the Ethanol extract showed lethality against the brine shrimp nauplii. It showed different mortality rate at different concentrations. From the plot of percent mortality versus log concentration on the graph paper, LC50 (µg/ml) and LC90 (µg/ml) of the ethanol extract of *Cucumis sativus* Linn. were deduced respectively.

Antacid & Carminative activity: Swapnil Sharma et al was investigate with the aqueous extract fruit pulp of C. sativa significantly neutralized acid and showed resistance against change in pH and also illustrate good carminative potential. The extract of C. sativa, has shown to possess significant carminative and antacid property.

Activity against ulcerative colitis: Patil et al was described after an authentic investigation with the aqueous extract of *Cucumis sativus* Linn. Fruit in ulcerative colitis in laboratory animals. In this investigation, the aqueous extract of *C. sativus* L. selected for screening against experimentally induced bowel disease. The extract of *C. sativa*, has shown to possess significant property against ulcerative colitis.

Hepatoprotective activity: H. Heidari et al was studied the effect of *Cucumis sativus* against cumene hydroperoxide induced-oxidative stress. Results showed that aqueous extract of *Cucumis sativus* acts as a hepatoprotective and antioxidant agent against CHP-induced hepatotoxicity suggesting that antioxidants and radical scavenging components of *Cucumis sativus* fruit extract can easily cross the cell membrane and cope with the intracellular ROSformation.

Hypoglycemic and Hypolipidemic activity: R. Sharmin et al was studied Hypoglycemic and Hypolipidemic Effects of Cucumber in Alloxan Induced Diabetic Rats(AIDRs). It was concluded that the ethanol extracts of Cucurbitaceae family fruits, cucumber, white pumpkin and ridge gourd has significant antihyperglycemic effects in AIDRs. They also have the capacity to reduce the elevated lipid profiles in AIDRs. Ridge gourd has also significant

effects to restore the depressed hepatic glycogen levels in AIDRs. Therefore, we believe that these fruits extracts can be useful, at least as an adjunct, in the therapy of diabetes, a condition in which hyperglycemia and hyperlipidemia coexist quite often. However, further study is necessary for the screening of chemical compounds and the structure elucidation of the respective antidiabetic leads as well as their exact mechanism.

Wound healing activity: Patil et al were studied on pharmacological evaluation of wound healing potential of *Cucumis sativus*. He stated that aqueous extracts of *Cucumis sativus* have proper efficacy on wound healing.

Linoleic acid probably inhibits growth of *Staphylococcus aureus*by increasing the permeability of the bacterial membrane as a result of its surfactant *action*, and the presence of the PC plasmid increases these *effects*.

Mizaj (Temperament): Cold 2^0 and Moist 2^0

Musleh (Corrective): Joen and Honey

Badal (Proximal substitute): Khira seed/ Tormuj beej.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent ,Appendix 2.2.2.
Total Ash	: Not more than 6 percent, Appendix 2.2.3
Acid-insoluble ash	: Not more than 1 percent, Appendix 2.2.4
Alcohol soluble extractives	: Not less than 5 percent, Appendix 2.2.6
Water soluble extractives	: Not less than 7 percent, Appendix 2.2.7.

TLC : TLC of the alcoholic extract on precoated silica gel "G plate"(0.2 mm thick) using chloroform: methanol (20:0.5) shows spots at Rf 0.03 (purple), 0.40 (brown),0.48 (purple) 0.52 (light purple), 0.60 (purple) 0.70 (light grey) and 0.78 (pinkish brown). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Mudire Baul; Musakkine safra wa khoon and Dafe atash. .

Muhall-e- Istamalat (Therapeutic uses): Sozishe Baul and Hiddate Safra wa khoon.

Meqdar–e-Khorak (Dose): 5-7gm

Side effects/ adverse effects: Excess consume may cause dyspepsia.

Important formulations: Sharbat e Bazoori Motadil; Jawarishe Zafrani and Kurse Awazkusha.

KHULANJAN

(Rhizome)

Khulanjan is a dried rhizomes of *Alpinia galanga* (Linn.). Its a herbaceous plant 2 m high, having lanceolate and smooth with white margin blade-like leaves, small greenish white flowers about 3 cm long and orange red fruits.Rhizome is built up from cylindrical subunits (circular cross-section), whose pale-reddish surface is characteristically cross-striped by reddish-brown, small rings. The interior has about the same colour as the skin and is hard and woody in texture. Fruit a capsule, globose and ribbed. Seed angled.

Other names:

a) Botanical name: *Alpinia galanga* (Linn.) Sw. Syn. *Alpinia calcarata* Rosc.

b) Family: Zingiberaceae

c) Bengali name: Boch/ Malayvacha/Kulanjan

d) English name: Greater Galangal

Description:

a) General: The drug Khulanjan consists of dried rhizomes of Alpinia galanga (Linn.) Sw. syn. Alpinia calcarata Rosc (Zingiberaceae). The plant is found in the eastern Himalayas and South west India. It is also cultivated throughout India especially in East Bengal and South India. The plant occurs during late summer or early. Flowering takes place during April - May.

b) Macroscopic: The rhizomes are large, with a spicy taste and pungent odour. The skin of the rhizome is deep orange- brown in colour which is prominently contrasting with pale-buff colour of the internal portion. Rhizomes are marked with wavy annulation of the leaf basis which possess a lighter colour than the remaining surface.

c) Microscopic: The rhizome is characterized by the presence of a distinctive thick-walled endodermis which divides the rhizome into two parts, the outer cortical layer and the inner ground tissue containing closely scattered vascular bundles, which are completely sheathed. The most characteristic feature of the cortex is the presence of numerous scattered vascular

bundles. Each vascular bundle is enclosed within a sheath of 3-4 layers of fibres. Vascular bundles of the ground tissue are numerous and closely scattered. Those bundles, just under endodermis, are more close to each other and form almost a ring just under the endodermis. Ground parenchyma also contains oleo-resinous matters and starch grains.

Powder: Powder analysis of the crude drug revealed the presence of fragments of epidermis, parenchymatous cells, oleo-resin cells, fibres with elongated, lignified tapering ends, vessels which are thick-walled, elongated having spiral thickenings and With blunt ends. Starch grains are abundant.

Parts used: Rhizomes, Leaves and Seed

Habitat: Found in hilly areas,

Phytoconstituents:

Glycisides, Protiens, Carbohydrates, Resins, Steroids, Triterpines, Aodium, Potassium, Calcium, Magnesium, Iron, Chloride, Phosphate and Sulphate. Essential oil from rhizomes contained seven components-methyl cinnamate, cineole, 1-camphene, 1-borneol, methyl chavicol, cargene and alpha (α)- pinene.

The rhizome contains up to 1.5% essential oil (1,8 cineol, α-pinene, eugenol, camphor, methyl cinnamate and sesquiterpenes). In dried galanga, the essential oil has quantitatively different composition than in fresh one. Whereas α-pinene, 1,8-cineol, α-bergamotene, trans-β-farnesene and β-bisabolene seem to contribute to the taste of fresh galanga equally, the dried rhizome shows lesser variety in aroma components (cineol and farnesene, mostly). The resin causing the pungent taste (formerly called galangol or alpinol) consists of several diarylheptanoids and phenylalkanones (the latter are also found in ginger and grains of paradise). Furthermore, the rhizome is high in starch.

Af'aal-e-Adviya (Pharmacological Activities):

Many pharmacological studies have been conducted recently on *Alpinia galanga*. A summary of the findings is presented below:

Antimicrobial Activity: The essential oils obtained from fresh and dried rhizomes of *Alpinia galanga* show antimicrobial activity against g-positive bacteria. An extract from the dried rhizome shows antimicrobial activity against Trichophytonmentagrophytes.

A crude acetone extract of the rhizomes of *Alpinia galanga* exhibited antiplasmid activity against Salmonella typhi, Escherichia coli and vancomycin resistant Enterococcus faecaliswith an efficiency of 92%, 82% and 8% respectively at 400 micro g/ml SIC Using Agar well diffusion method, methanol extracts of Alpinia *galanga* have been evaluated against pathogens viz. Bacillus subtilis MTCC 2391, Enterobacteraerogene, Enterobacter cloacae, Enterococcus faecalis, Escherichia coli MTCC 1563, Klebsiellapneumoniae, Pseudomonas aeruginosa MTCC 6642, Salmonella typhimurium, Staphylococcus aureus and Streptococcus epidermis. Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were determined using the macrodilution method. The extracts have shown excellent activity towards all the pathogens with MIC and MBC values ranging from 0.04–1.28 mg/ml and 0.08– 2.56 mg/ml, respectively.

Antifungal activity: The ethanolic extracts of Alpinia galanga found to possess good antifungal activities against Trichophytonlongifusus. Diterpene compound, (E)-8β, 17-epoxylabd-12-ene-15, 16-dialsynergistically enhanced the antifungal activity of quercetin and chalcone against Candida albicans. 21 Strong antifungal activities of n-Hex and DCM fractions of Alpinia galanga has been demonstrated by zone of inhibition assay. High phenolic and flavonoid content and strong free radical scavenging activity of the fractions of A.galanga has been observed.

Antiinflammatory activity: Antiallergic principles have reported from Alpinia galanga rhizome. 80% aqueous acetone extract of the rhizomes of Alpinia galanga expressed the inhibition of the release of beta-hexosaminidase, as a marker of antigenIgE-mediated degranulation in RBL-2H3 cells. 1′S-1′-acetoxychavicol acetate and 1′S-1′-acetoxyeugenol acetate exhibit potent inhibitory activity. Additionally, ear passive cutaneous anaphylaxis reactions in mice and the antigen-IgE-mediated TNF-α and IL-4 production are inhibited by 1′S-1′-acetoxychavicol acetate and 1′S-1′-acetoxyeugenol acetate. In RBL-2H3 cells, both participate in the late phase of type I allergic reactions. Purification of the acetone extract of Alpinia galanga produces p-hydroxy cinnamaldehyde, which is a potential therapeutic agent for treatment of Osteoarthritis as it influences human chondrocytes. Ethanolic extract of Alpinia galanga rhizome has scientifically validated anti-inflammatory screening technique on rats by carrageenan induced pleurisy. The results obtained indicate that the ethanolic extract has significant activity in rats. Hence, the ethanolic extract of A. galanga rhizome has potential anti-inflammatory activity. Anti-inflammatory activity of Petroleum ether, Chloroform, Methanolic and Aqueous methanolic (1:1) extracts of *Alpinia galanga* Willd has been investigated in carrageenan induced paw edema in Wistar rats and compared to a

positive control drug, Ibuprofen. Methanolic extract of *Alpinia galanga* showed maximum inhibition of 79.51 % on carrageenan induced rat paw edema. Hepatotoxicity: It has observed that the hepatoprotective effect of the crude extract of *Alpinia galanga* at 200 and 400 mg kg-1 treated paracetamol induced hepatotoxicity in rats. Immunomodulator: Hot water polysaccharide extracts of *Alpinia galanga* (L.) Willd. Shows marked stimulating effect on the reticulo-endothelial system (RES) and increased the number of peritoneal exudate cells (PEC), and spleen cells of mice. Hence, hot water polysaccharide extracts of A. The challenge has immuno-stimulating activity.

Anti-Diabetic activity: The extracts of the rhizome of *Alpinia galanga* in rabbits show hypoglycemic activity on their blood glucose levels. In normal rabbits, powdered rhizome and its methanol and aqueous extracts significantly lowered the blood glucose. Methanolic extract of aerial parts of *Alpinia galanga* was effective in controlling blood glucose level and improve lipid profile in euglycemic as well as diabetic rats. The methanolic extracts of *Alpinia galanga* shows a considerable inhibition of the haemoglobin glycosylation. The extract of the plant inhibits the activities of α -amylase and α-glucosidase in a concentration dependent manner which indicate that the plant possesses considerable in vitro antidiabetic activity.

Anti-Oxidant activity: Antioxidant activity has shown by extract of *Alpinia galanga*. 50% ethanol in water was studied for its antioxidant activity and composition in comparison with two other samples based on a water extract and the essential oil. By using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) and oxygen radical absorbance capacity (ORAC) the antioxidant activities were measured. Highest DPPH free radical scavenging ability was reported from the ethanolic extract. Highest ORAC value observed when compared to the water extract and the essential oil. Antioxidant activity of 1'-acetoxychavicol acetate and its related compounds has been reported from the rhizomes of *Alpinia galanga*. Methanol extracts of *Alpinia galanga* has been evaluated for total phenolic content (TPC) and antioxidant activities (AOA). Using 1, 1-diphenyl-2-picrylhydrazyl (DPPH), reducing power (RP), ferrous ion chelating as well as β-carotene bleaching assays the AOA has been investigated. A.galanga leaves and flowers showed highest chelating and β-carotene bleaching abilities. So the leaves of the plant may serve as potential dietary source of natural antioxidant.

Anti-Ulcer property: Extract of *Alpinia galanga* has been studied on experimentally induced gastric ulcers in rats. At a dose of 500mg/kg of the ethanolic extract, the intensity of gastric mucosal damage induced by pyloric ligation and hypothermic restraint stress in rats significantly reduced. The experimental result shows significant antisecretory and

cytoprotectively action of A. galanga which may be responsible for its antiulcer activity. The potent anti-ulcer principles, 1'-acetoxychavicol acetate (1) and 1'-acetoxyeugenol acetate (2), were isolated from the seeds of *Alpinia galanga* and established by chemical syntheses. The effects of 1'S-1'-acetoxychavicol acetate and related phenylpropanoids isolated from the rhizomes of *Alpinia galanga* on ethanol-induced gastric lesions in rats has been evaluated. It has been observed that, 1'S-1'-acetoxychavicol acetate and 1'S-1'-acetoxyeugenol acetate markedly inhibited the ethanolinduced gastric mucosal lesions.

Mizaj (Temperament): Hot 2° and Dry 2°

Musleeh (Corrective): Not require.

Badal (Proximal substitute): No proximal substitute is identified.

Identity, purity and strength:

Foreign Matter	- Not more than 2%, Appendix 2.2.2.
Total Ash	- Not more than 6%,Appendix 2.2.3.
Acid insoluble ash	- Not more than 3%, Appendix 2.2.4.
Alcohol-soluble extractives	- Not less than 1%, Appendix 2.2.6.
Water-soluble extractives	- Not less than 11%, Appendix 2.2.7.

TLC behaviour of petroleum ether (60-80^0) extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Benzene: Ethyl acetate (9:1)	I_2 vapours	2	0.05, 0,94

Aa'maal-e-Adviya (Pharmacological Action):

Mufarreh, Muqawwi-e-Qalb, kasir-e-Riyah, Muqawwi-e-Meda, Mutaiyyib-e-Dahan, Munaffis-e-Balgham. Muqawwi-e-Bah, Mohallil-e-Waram.

Mahall-e-Istemalat (Therapeutic use):

Bakhr-ul-Fam, Zeeq-un-Nafas, Bohat-us-Saut, Zof-e-Bah, Nafkh-e-Shikam, Waj-ul-Mafasil

Meqdar-e-Khorak (Dose): 2-3 gm

Side-effects / Adverse-effects: No significant side effects have been observed.

Important formulations: Habb-e-Ambar, Habb-e-Mumsik, Halwa-e-Gazer, Jawarish-e-Jalinoos, Jawarish-e-Kundur. Jawarish-e-Narmushk, Jawarish-e-Ood-Shireen, Luboob Kabir, Luboob Saghir, Majoon-e-Chobchini, Majoon-e-Khadar, Majoon-e-Seer Alvi Khani, Araq-e-Chobchini, Ma'joon khulanjan, Safoof khulanjan, Habb-e- khulanjaan, Arq-e- Pan, Habb-e-Jadwar, Laooq-e-Sufrah, Luboob Mo'tadil, Ma'joon Muqawwi Wa Mumsik, Ma'joon Sa'leb and Ma'joon Samagh etc.

KUNJUD SIYAH

(Seed)

White and black sesame seeds come from the herb Sesamum indicum, which belongs to the Pedaliaceae family. It is one of the oldest cultivated plants in the world, grown for culinary use as well as in Unani medicines. Each seed pod contains hundreds of seeds that vary in color from creamy white to charcoal black depending on the cultivator. Black sesame seeds have a slightly nuttier flavor than the white counterpart, but both kinds are excellent sources of phytonutrients, antioxidants, dietary fiber and health-promoting nutrients.

Other names:

a) Botanical name:*Sesamum indicum*D.C. Syn. S. *Orientale*Linn.

b) Family: Pedaliaceae

c) Bengali name: Kalo Till

d) English name:Sesame Seeds, Gingelly Sesame

Description:

a) General: The drug Kunjad Siyah consist of dried seeds of *Sesamum indicum*.An erect annual plant more or less foetid and glandular. The plant is indegenious to tropical Africa and cultivated throughout the warmer parts of Indo-Bangaladesh. It occurs from August-June. Flowering takes place during October-December and fruiting from December-January.





b)Macroscopic:The seeds are small(2-3 mm long, 1.5 mm wide and lmm thick), black ovoid laterally compressed. One end is broad which tapers towards the hilum. The seeds are highly oily in nature, albuminous, longitudinal ridges. The seed coat is simple, thin and black. Seeds are swee in taste.

c) Microscopic:The microscopic examination of seed in cross section reveals that the seed coat shows a simple structure. The 1-celled thick outer epidermis of seed coat comprises radially elongated palisade cells. All these cells bear characteristically a large cup-shaped crystals of calcium oxalate in their inner half except the cells of ridges. The radial walls are wavy and more thickened at their inner halves. Rest of the testa comprises 2-3 layers of crushed cells. It is followed by a thin cuticle in form of a yellow membrane which clearly differentiates the seed coat from endosperm. The endosperm and cotyledons are made up of polygonal parenchymatous cells which contain abundance of oil drops and aleurone grains. The cotyledons are externally lined small rectangular cells. Besides, the parenchymatous cells lying on the inner side of two cotyledons are elongated like palisade while the remaining cells are isodiametric in shape.

Powder: It is black, heterogenous and oily with sweet taste and a charecterristic oily odour, microscopic examination of powder reveals that it is made up rif abundance of large epidermal cells, some bearing a big crystal, palisade and isodiarnetric parenchyma cells of varying sizes, each densely filled with the protein bodies. All these cells moustly, occur in small groups. Crystals are also present in large number.

Parts used: Seeds

Habitat:

The plant is indigenous to tropical Africa and cultivated in Bangladesh. It occurs from August-June. Flowering rakes place during October-December and fruiting December-January.

Phytoconstituents:

Steroids/Terpenoids, Carbohydrate, protein, glycosides, alkaloids.
aluminium, iron, calcium, magnesium and potassium.

Af'aal-e-Adviya (Pharmacological Activities):

Some of Af'aal-e-Adviya (Pharmacological activities) are describe here.

Anti-pyretic and anti-inflammatory activity: Sesame oil produced significant antipyretic effect comparable to paracetamol. In a study, the sesame oil administered as dietary supplement produced analgesic, antipyretic and anti-inflammatory activities in animal models. The anti-inflammatory activity was assessed on the basis of paw edema inhibition induced by the injection of carrageenan (an edematogenic agent) into the subplantar region of the right hind paw of the rat. Their results showed that the sesame oil and sesamin inhibited the formation of pleural exudate and the leucocyte migration confirming the anti-inflammatory activity.

Anti-oxidant effect of S. indicum Sesame increases the recycling of vitamin E, improves liver functions and provides protection against alcohol-induced oxidative stress. Sesamin decreases cholesterol levels while increasing high-density lipoprotein levels. Sesame oil enhances hepatic detoxification of chemicals, reduces the incidence of chemically-induced mammary tumors, and protects against oxidative stress [5], which is involved in the pathogenesis of endotoxin intoxication. Oxidative stress may be caused by reactive oxygen intermediates (ROI). ROI, including singlet oxygen, nitric oxide (NO), hydrogen peroxide, and free radicals, all of which are important mediators of cellular injury and play a putative role in oxidative stress in endotoxin intoxication. The effects of ethanolic extract of sesame coat on oxidation of low-density lipoprotein (LDL) and production of nitric oxide in macrophages were investigated. The results showed that extract in the range of 0.01-0.8 mg/ml markedly inhibited copper-induced LDL oxidation and H2 O2 induced cell damage that implies that ethanolic extract could exhibit a protective action on biomolecules and generation of inflammatory mediators in vitro. Clinically, it was found that sesame oil consumption helped in hypertensive patients remarkably reduced oxidative stress and simultaneously increases glutathione peroxidase (GPx), SOD and catalase activities.

Anti-microbial: activity Sesame is naturally antibacterial for common skin pathogens such as Staphylococcus and Streptococcus, as well as common skin fungi such as athlete's foot fungus. As a throat gargle, it kills Streptococcus and other common cold bacteria. It helps sufferers of psoriasis and dry skin ailments. It is a useful natural ultraviolet protector. In a study, the results revealed that minimum inhibitory concentration (MIC) of sesame oil against Salmonella typhi is 10 µl/ml. However, for other organism the MIC values were in the range of 350-500 µl/ml. The sesame oil shows best antimicrobial activity and also equal with standard Kanamycin and also it shows highest zone of inhibition against S. typhi. It reported that sesame oil is found to have the antibacterial activity against Streptococcus mutans, Lactobacilli acidophilus and total bacteria.

Anti-hypertensive activities: In a study, it is revealed that the sesamin and its active metabolites can induce antihypertensive effects in experimental animal models. A study in hypertensive patients indicated that sesame oil consumption remarkably reduced oxidative stress and simultaneously increased GPx, superoxidase dismutase, and catalase activities. These results support the hypothesis that sesame oil consumption may help to enhance antioxidant defense system in human beings. The investigators suggested that sesamin is a useful prophylactic treatment in hypertension and cardiovascular hypertrophy. In another study, among the hypertensive patients using nifedipine (calcium channel blocker) was compared along with other edible oils. Among the groups, sesame appeared to be promising against the blood pressure rise.

Sesame in lipid metabolism: Considering the chemical composition, the dietary intake of sesame oil is expected to improve the condition preventing any postprandial lipemia or lipid oxidation. Although many reports are available concerning the effect of sesamin on lipid metabolism, but only a few studies using the intact sesame oil as a diet are available. It seems it possess lipid peroxidation and also the lipid profile. It is apparent that sesame rich in lignans more profoundly affects hepatic fatty acid oxidation and serum triacylglycerol levels. Therefore, consumption of sesame rich in lignans results in physiological activity to alter lipid metabolism in a potentially beneficial manner. Sesamol has been shown to reduce lipopolysaccharide-induced oxidative stress and upregulate phosphatidylinositol 3-kinase/Akt/endothelial nitric oxide synthase pathways.

Wound healing properties: Free radicals are generated at the site of injury, which are known to impair the healing process by causing damage to cellular membranes, nucleotides, proteins and lipids. In this context, several antioxidants, such as curcumin, vitamin E, have been reported to give protection against oxidative damage to tissues. The use of antioxidants has been shown to promote wound healing. Sesame oil extract has potential antioxidant activity which helps to prevent oxidative damage and promote the healing process. S. indicum seeds and oil both promote wound healing in experimentally induced rats. Gel containing seeds or oil applied topically or administration of seeds or oil orally significantly promoted the breaking strength, wound contraction and period of epithelialization in inicision, excision and burn wound models.

Sesame in atherosclerosis: Sesame oil could inhibit atherosclerosis lesion formation effectively, perhaps because of the synergistic actions of fatty acid and nonsaponifiable components. A modified form of sesamol (INV-403) to enhance its properties and assessed

its effects on atherosclerosis. INV-403 is a novel modified lignan derivative that potently inhibits atherosclerosis progression via its effects on IKK2 and nuclear factor- B signaling.

Anti-cancer properties: Sesame oil has been found to inhibit the growth of malignant melanoma in vitro and the proliferation of human colon cancer cells. Sesame seed consumption increases plasma γ-tocopherol and enhances vitamin E activity, which is reported to prevent cancer and heart diseases. Cephalin from sesame seed has hemostatic activity. Historically, fiber is used as an ant diabetic, antitumor, antiulcer, cancer preventive, cardioprotective and laxative. Myristic acid has cancer preventive capability and is found in sesame seed ranging from 328 to 1,728 ppm.

Other medicinal uses: In recent experiments in Holland, the oil has been used in the treatment of several chronic diseases including hepatitis, diabetes and migraine. These effects are supported by main pathophysiological theories of migraine such as neural and sensitization theories. Sesame flower extract possessed tumor arresting property. Sesame oil is used as a solvent for intramuscular and has nutritive, demulcent, and emollient properties and has been used as a laxatives. The leaves are rich in a gummy matter and when mixed with water from rich bland mucilage that is used in the treatment of infant cholera, diarrhea, dysentery, cataract, boils, carbuncle, menstrual irregularities, poly-urea, stomach- trouble, serious burns skin diseases, alopecia and used as a tonic.

Sesame plant is not only in use for culinary purposes, but also in various applications such as industrial, engineering, and pharmaceutical sesame. Sesame is an important source of phytonutrients such as omega-6 fatty acids, flavonoid phenolic anti-oxidants, vitamins, and dietary fiber with potential medicinal effects. Sesame reveals the truth that it is a more helpful beneficial plant with anti-pyretic, antiinflammatory, antioxidant, anti-microbial, anti-hypertensive, anticancer and other properties.

Mizaj (Temperament): Hot 1° Moist 1°

Musleeh (Corrective): Not require.

Badal (Proximal substitute): No proximal substitute is identified.

Identity, purity and strength:

Foreign Matter	-	Not more than 2%, Appendix 2.2.2.
Total Ash	-	Not more than 31% Appendix 2.2.3.

Acid insoluble ash	- Not more than 37% , Appendix 2.2.4.
Alcohol-soluble extractives	- Not less than 8%, Appendix 2.2.6.
Water-soluble extractives	- Not less than 6%, Appendix 2.2.7.

TLC behaviour of petroleum ether (60-80^0) extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Benzene: Chloroform (4:1)	I_2 vapours	1	0.50

Aa'maal-e-Adviya (Pharmacological Action):

Mulaiyin, Mohallil-e-Waram, Muqawwi-e-Bah, Muqawwi-e-Kuliya, Dafe Humma, Mundamel.

Mahall-e-Istemalat (Therapeutic use):

Kasrat-e-Baul, Zof-e-Kuliya-wa- Masana, Baul-fil-farash, Humma, Iltehab, Quruh

Meqdar-e-Khorak (Dose): 5 gm

Side-effects / Adverse-effects: No significant side effects have been observed.

Important formulations:

Mufarreh Sosambari, Majoon-e-Baladur, Habb-e-Hindi, Mumsik, Majoon-e-Salab.

MAGHZE TUKHME KADDU SHIREEN

(Kernel)

Cucurbita moschata is a species originating in either Central America or northern South America. It includes cultivars known as squash or pumpkin. *C. moschata* cultivars are generally more tolerant of hot, humid weather than cultivars of *C. maxima or C. pepo.*

Other names:

a. Botanical Name: *Cucurbita moschata*

b. Family: Cucurbitaceae

c. Bengali Name: Kumra

d. English Name: Pumpkin

Description

a. General**:**The drug Maghze Kaddu Shireen consists of kernel of *Cucurbita moschata* belongs to Family- Cucurbitaceae, an annual herbaceous, tendril climber, large and spreading, cultivated throughout tropical and sub-tropical region in India. It is cultivated for its fruits used as vegetables**.**

Fig: No: 23: Pumpkin

b. Macroscopic**:**White to cream; ovoid or oblong; compressed; size about 10 mm length, 5 mm breadth and 2 mm width. Surface smooth, glossy, a groove or slightly depression on one side; no characteristic odor and taste –sweetish oily.

c. Microscopic**:**TS of kernels shows single layer of inner epidermis of the testa followed by cotyledons consisting of polygonal parenchymatous cells containing aleurone grains and abundant oily globules. Outer epidermis of cotyledon single layer, inner most two layers much more elongated palisade like cells and distinct patches of small thin walled polygonal cells present midway in roughly trapezoidal shape.

d. Powder**:** Cream, palisade like elongated cotyledonary parenchymatous cells from the inner most layer of cotyledons, cotyledonary parenchyma containing aleurone grains and oil globules and spiral vessels.

Parts used: Kernel

Habitat: Bangladesh and India

Chemical Constituents: Avenasterol, codisterol, clerosterol, isofucosterol, compesterol, sitosterol; spinasterol, palmityic, palmitoleic, stearic, oleic, linoleic acid, rhamnose, fructose, glucose, galactose, sucrose and raffinose.

Afa'al-e-Adviya (Pharmacological activities): Pumpkin is rich in fiber, minerals and carotenoids, particularly β-carotene, the precursor of vitamin A (Azevedo-Meleiro and Rodriguez-Amaya 2007;de Carvalho et al., 2012). Pumpkin also con- tains bioactive peptides, polysaccharides, para-aminobenzoic acid, and γ-aminobutyric acid (GABA) (Fu, Shi, & Li, 2006). Furthermore, pumpkin has also been reported to exhibit antioxidant, antidiabetic, antibacterial, immune-enhancing, and cholesterol-lowering activities (Fu et al., 2006; Wu, Zhu, Diao, & Wang, 2014).

Mizaj (Temperament): Cold & Moist

Musleh (Corrective): Unknown

Badal (Proximal substitute): No proximal substitute is identified.

Identity, purity and strength:

Foreign Matter : Not more than 2 percent, Appendix 2.2.2.

Total Ash	: Not more than 4 percent, Appendix 2.2.3.
Alcohol soluble Ash	: Not less than 25percent, Appendix 2.2.6.
Water soluble extractive	: Not less than 9percent, Appendix 2.2.7.
Loss on drying at 105^0C	: Not more than 8 percent, Appendix 2.2.9.

TLC: Extract of 2 gm sample with 20 ml of chloroform and alcohol under reflux on a water bath for 309 min. Filter and concentrate to 5 m and carry out the thin layer chromatography. Apply the chloroform extract on TLC plate. Develop the plate to a distance of 8.5 cm using Toluene: Ethyl acetate (5:1.5) as mobile phase. After development allow the plate to dry in air and examine under under UV (366 nm). It shows major spot at Rf 0.79 (dark blue). Dip the plate in Vanillin-Sulphuric acid reagent followed by heating the plate for 10 minutes at 110^0C and observe under visible light. The plate shows major spots at Rf. 0.95, 0.79 and 0.57 (dark blue).

Apply the alcohol extract on TLC plate. Develop the plate to a distance of 8.5 cm using Toluene: Ethyl acetate (5:1.5) as mobile phase. After development allow the plate to dry in air and dip the plate in Vanillin-Sulphuric acid reagent followed by heating the plate for 10 minutes at 110^0C and observe under visible light. The plate shows major spots at Rf. 0.96 (dark blue), 0.79, 0.72 and 0.59 (violet). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Dafe K irmi Ama (Antihelminthic); Mudire Baul (Diuretics) and Muliyan-e-Shikam (Laxative).

Muhall-e- Istamalat (Therapeutic uses): Qurooh (Ulcer); Mufatteh Sudad (Deobstruent); Yarqan (Jaundice); Zarb-wa-khilfah (Spur/ Malabsorption Syndrome).

Meqdar-e-Khorak (Dose):4-8 gm

Side effects/ adverse effects: Nausea, vomiting and loose motion.

Important formulations: Laooq-e-Sepistan, Laooq-e-Behidana; Khamira Khashkhas; Mufareh Barid; Mufareh Barid Jawahirwali; Mufareh Barid Qabi and Luboobe Barid.

MAYEEN KALAN

(GALL)

Tamarix gallica, the *French tamarisk*, is a deciduous, herbaceous, twiggy shrub or small tree reaching up to about 5 meters high. It is indigenous to Saudi Arabia and the Sinai Peninsula, and very common around the Mediterranean region.

Other names:

a. Botanical Name: *Tamarix gallica* Linn; *T.troupiirtole*

b. Family: Tamaricaceae

c. Bengali Name: Jhaoghacch

d. English Name: Tamarix

Description

a. General**:**The drug Mayeen Kalan consists of the dried galls of *Tamarix gallica* Linn; *T. troupiirtole belongs to* Tamaricaceae. It grows in Punjab, Uttar Pradash, Sindh, Baluchistan and Mount Abu.

Fig: No: 24: Jhao Gach

b. Macroscopic: The galls are grey, hard 1.5 -3.5 cm in diameter, fracture brittle, surface porous; taste bitter and odor-indistinct.

c. Microscopic:TS of gall consists of epidermis, ground tissue and vascular tissue; epidermis, multilayered, cells tangentially elongated, thick walled, externally covered by thick cuticle of 5-6 micron thick; ground tissue parenchymatous, cells irregular, thin walled with inter cellular spaces; some of the cells contain brown pigment; prismatic calcium oxalate crystals are also found in the ground tissue. Vascular tissue consists of xylem and phloem; xylem contains vessels with spiral and scalariform thickening; xylem fibers and xylem parenchyma. Phloem contains sieve tubes, phloem fibers and phloem parenchyma.

d. Powder**:** Brown, free floating on the surface of water, odour indistinct and bitter taste; contains vessels with annular and spiral thickening and prismatic calcium oxalate crystals.

Parts used: Galls

Habitat: Saudi Arabia and the Sinai Peninsula, and very common around the Mediterranean region; Bangladesh and India

Chemical Constituents: *Tamarixgallica* consists of tannin (50%) eg. ellagic acid and gallic acid Major chemical constituents of tamarix were tamarixin, tamarixetin, troupin, 4-methylcoumarin, 3, 3'-di-0-methylellagic acid and quercetol (methyllic ester)The numerous polyphenols were also present in tamarix like anthocyanins, tannins, flavonones, isoflavonones, resveratrol and ellagic acid. It also constituted antioxidants like carotenoids and essential oils

Afa'al-e-Adviya (Pharmacological activities):

Antioxidant activity: Leaves and flowers of *Tamarixgallica* showed antioxidant activity, however flowers showed higher antioxidant activity as compared to leaves. The inhibitory concentration for fifty percent animals (IC 50) values of the flower extracts were 1.3 (β-carotene bleaching) to 19 times (lipid peroxidation inhibition), lower than those for leaves. Flowers extract demonstrated the highest total phenolic content (135.36 mg GAE/g DW). RP-HPLC analysis showed syringic acid, isoquercitin and catechin as the major phenolics. Methanolic and ethyl acetate extracts of Tamarixgallica showed antioxidant activity, both extracts led to the isolation of three known phenolic compounds: 3', 3, 5-tri hydroxy 4', 7-diméthoxy flavone , 5-hydroxy 4' ,3,7- trimethoxyflavone and isorhamnetine respectively.

The structures of these above compounds were elucidated by mass specroscopy and a series of 1D and 2D NMR analyses. Some extracts and the pure isolated compounds have also been evaluated for their antioxidant activities through different methods: 1,1-diphenyl-2-picrylhydrazyl (DPPH) and cupric-reducing antioxidant capacity (CUPRAC) methods demonstrated important radical scavenging activity with the antiradical power (ARP) of 5 (in DPPH method), and trolox equivalent antioxidant capacity (TEAC).

Mizaj (Temperament): Cold and Dry

Musleh (Corrective): Unknown.

Badal (Proximal substitute): No proximal substitute is identified.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 12 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 5 percent, Appendix 2.2.4.
Water soluble ash	: Not less than 5percent, Appendix 2.2.5

TLC: Petroleum ether extract on silica gel "G plate" using n-Hexane: Diethy-ether (95:5) as mobile phase shows four spots at Rf 0.15, 0.40, 0.65 and 0.85 on spraying the plate with methanolic-Sulphuric acid reagent and heating the plate for 10 minutes at 105^0C. Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Qabiz (Constipation) and Habis (Styptic)

Muhall-e- Istamalat (Therapeutic uses): Istirkhae-Lissa (Losening of Gum); Lissa e Damiya (Bleeidng Gums); Wajaul Asnan (Odontalgia); Qula (Stomatitis); Ishal (Diarrhoea); Surat e Inzaal (Premature Ejaculation); Riqqat e Mani (Attenuated Semen); Kasrate Ehtelam (Excessive Noctural Emission) and Sailanur Rehem (Leucorrhoea).

Meqdar-e-Khorak (Dose):5-7 gm

Side effects/ adverse effects: Nausea and Vomiting

Important formulations: Habbe Paichis; Safoofe Salab and Sufoof e Sailanur Rehem.Syrup Talkh. Tab Icterin and Suf Jigarin.

MULSARI

(Flower)

This drug Mulsari is consists of dried flowers and buds of *Mimusops elengi*Linn.

Other names:

a) Botanical name: *Mimusops elengi* Linn.

b) Family: Sapotaceae

c) Bengali name: Bakul Ful, Bakal, Bohl, Bukal

d) English name: Bullet wood, Indian Medlar

Description:

a) General: Mulsari (*Mimusops elengi* Linn.) is a large glabrous evergreen tree, 12-15 m high, with a compact leafy head and short erect trunk, bark smooth, scaly, and gray, Leaves 6.3-10 by 3.2-5 cm, elliptic shortly acuminate, glabrous, base acute or rounded, petioles 1.3-2.5 cm long, flower white, fragrant, nearly 2.5 cm across solitary, buds ovoid, acute; pedicels 6.20 mm long. Calyx 1 cm long, stamens 8, opposite to the inner circle of lobes. Ovary appressedly silky-pubescent, fruit berry about 2.5 cm long, ovoid, yellow when ripe, seed solitary, ovoid, compressed, brown, shining.

b) Macroscopic : Drug consists of dried flowers and flowering buds with pedicels ; flower white to yellowish brown, fragrant, nearly 2.5 cm across, pedicel upto 2 cm long; buds ovoid; bisexual, actinomorphic, bracteolate. sepals 4 to 12, imbricate in bud, base connate; corolla gamopetalous in 2 whorls, imbricate in buds, lobes about 8 to 10 in inner whorls and 12 to 16 in outer whorl; stamens epipetalous opposite petals in the inner walls; anthers 2 celled, style often apically lobed, ovary superior, carpels typically 4 or 5 in a range of I to. placentation axile; ovule one in each carpel, anatropous; characteristic aromatic odour and sweet acrid taste.

c) Microscopic: **Petal:** Transverse section shows an upper and lower epidermis consisting of closelypacked rectangular cells of uniform size: ground tissue irregular, spongy parenchymatous; vascular bundles of various sizes consisting of xylem and phloem elements, surrounded by bundle sheath; upper surface in surface view shows closely packed, slightly wavy walled, thin laterally elongated epidermal cells without intercellular spaces; lower surface in surface view shows closely packed, thick and wavy walls epidermal cells without intercellular spaces.

Sepal: Transverse section shows glandular uniseriate; "T" shaped and multicellular trichomes on upper and lower epidermis; middle portion of the upper epidermis devoid of any type of trichomes; ground tissue parenchymatous: several conjoint, closed vascular bundles surrounded by bundle sheath present; epidermal cells in surface view are sinuous on the upper less sinuous on the lower; stomata ranunculaceous, laticifers and crystals present.

Pedicel: Transverse section shows a ridged outline, a single layer of epidermis bearing trichome similar to those on sepals; cortex consists of irregular parenchymatous and some laticiferous cells; the vascular bundles around 8, conjoint, collateral and closed, arranged in a circle, abundant prismatic and rhombohedral calcium oxalate crystals present.

Androecium : Anther lobes tetrasporangiate, dehiscence extrorse; the wall of the anther lobe consists of an epidermal layer of rectangular parenchymatous cells, followed by a layer of epithelial cells and a subsequent layer of endothecium; the pollen grains about 15to 25µin diameter, single or in groups, spherical, pores four, the exine smooth and thick.

Gynoecium: The ovary is hexa to octa-carpellary, syncarpous and superior with a long style and insignificant stigma. It is covered by long 'T' shaped, branched, multicellular, uniseriate multicullular and unicellular glandular trichmomes; placentation axile, showing single large bundle in the transection; ovules anatropus.

Powder: Dark brown, shows numerous parenchymatous cells containing laticiferous cells, long 'T' shaped, branched, multicellular trichomes, uniseriate multicullular trichomes, unicellular glandular trichomes; scalariform and reticulate vessels, endothecial layer of anther and characteristic pollen grains about 15 to 35 µ in diameter; spherical, exine smooth, pores 4.

Parts used: Flowers, Bark, Fruits, Root, Seeds.

Habitat: It is distributed throughout the country.

Phytoconstituents:

Fresh flowers of Mulsari (*M. elengi*) on extraction with acetone yielded D-mannitol where as extraction with ethanol yielded β-sitosterol and β-sitosterol-β-D-glucoside. Flowers also yielded quercitol, ursolicacid and a triterpene alcohol which was later, identified as lupeol.

Af'aal-e-Adviya (Pharmacological Activities):

Some of Af'aal-e-Adviya (Pharmacological Activities) are described here.

Anti-hyperlipidemic activity: Methanolic extracts of flower (MFE) and leaves (MLE) of *Mimusops elengi* were evaluated for hypoglycemic effect in normoglycaemic and alloxan-induced diabetic rats. In diabetic rats, MFE and MLE treatment at a dose of 100 mg/kg, body weight for 7 days significantly ($P < 0.01$) decreased triglycerides levels compared to the diabetic control group.

Cognitive enhancing activity: The alcoholic extracts of *Mimusops elengi* flowers was used for the evaluation of cognitive enhancing activity using elevated plus maza and passive avoidance task method with Mentat as standard by using parameters of step down and transfer latency. Induction was carried out by MES and scopolamine for 7 days. On the 7th day the brain was isolated for evaluation of acetylcholinesterase enzyme activity. The alcoholic extracts (200 mg/kg BW) showed significant effect when compare to control. There was significant in step down latency and decrease in the of transfer latency and also decrease in acetylcholinesterase enzyme activity but was not as effective as that of standard drug.

Free radical scavenging and skin fibroblast proliferation activities: The study investigated the biological activities of the *M. elengi* flower extracts prepared by the two non-heated processes ($scCO_2$ and hexane maceration). The extracts from the $scCO_2$ method showed higher free radical scavenging and normal human skin fibroblast proliferation activities than those by the hexane maceration.

Antibacterial activity: The antibacterial activity of petroleum ether, chloroform, ethyl acetate and methanol extracts of the flowers of *Mimusops elengi* were screened against various pathogenic Gram positive and Gram negative bacterial strains viz. *Bacillus cereus, Enterobacter*

faecali, Salmonella paratyphi, Staphylococcusaureus, Escherichia coli, Proteus

vulgaris, Klebsiella pneumoniae, Pseudomonas aeruginosa and *Serratia marcescens* by 'agar well diffusion' method. Methanolic flower extract of Mimusops elengi showed pronounced

antibacterial activity against all the microorganisms tested with 25-30mm/50µL inhibition zone.

Antihyperglycemic activity: One study was done to evaluate the effect of aqueous bark extract of Mimusops elengi in alloxan induced diabetic rats. Diabetes was induced in rats by administering alloxan monohydrate (150 mg/ kg bw) intraperitoneally. The aqueous bark extract of Mimusops elengi at the dose level of 500 mg/ kg bw, produced significant alteration in biochemical and enzymatic parameters studied [8]. Methanolic extracts of flower and leaves of Mimusops elengi were evaluated for hypoglycemic effect in normoglycaemic and alloxan-induced diabetic rats. Both extracts of Mimusops elengi were administered orally (100 mg/kg, body weight) to normal and alloxan-induced diabetic rats. The fasting blood glucose (FBG), oral glucose tolerance test (OGTT) and alloxaninduced diabetic models were performed for the hypoglycemic effects and compared with tolbutamide (100 mg/kg, body weight), a standard drug. Both the extracts (flower and leaves) showed marked decreased ($P < 0.01$) in blood glucose level in normotensive rats within 2h after oral administration. A significant ($P < 0.001$) decreased in elevated blood glucose level was observed in glucose loaded animals.

Antinflammatory, Analgesic and Antipyretic activities: The antiinflammatory activity of alcohol extract of *Mimusops elengi*was evaluated using acute (carrageenan-induced paw oedema) and sub acute (cotton pellet) *in vivo*models of inflammation. The study revealed that 70% ethanol extract of *Mimusops elengi* has significant antiinflammatory activities in experimental animals at a dose of 200 mg/kg. Sehgal *et al.* investigated the antipyretic and analgesic activity of methanolic extract of **leaves** of *Mimusops* Antipyretic and analgesic activity was carried out on yeast induced pyrexia and tail immersion model in rats respectively at 100 and 200 mg/kg doses. The methanolic extract produced significant antipyretic effect in a dose dependent manner and an appreciable antipyretic effect was noticed at 200 mg/kg dose. A dose dependent analgesic activity was observed with significant effect at 200 mg/kg dose.

Neuroprotective activity: The study investigated the neuroprotective effect of hydroalcoholic extract of *Mimusops elengi* against cerebral ischemic reperfusion injury in rats. Pretreatment with extract at doses of 100 and 200mg/kg significantly improved the neurobehavioral alterations and reduced the infarct volume, edema and extent of BBB disruption induced by ischemia reperfusion injury. It also prevented the alteration in the antioxidant status and reduced the nitrite levels when compared to ischemic animals. The results indicated the neuroprotective effect of extract against stroke like injury. Researchers

concluded that the observed protective effect might be attributed to the polyphenolic compounds and their antioxidant and anti-inflammatory property.

Mizaj (Temperament): Hot 1^0 - Dry 2^0

Musleh (Corrective): Shahad khalis (pure honey), ghee (butter)

Badal (Proximal substitute): Bhon phalli (Corchorus depressus),Babool chhaal wa phal

Identity, purity and strength:

Foreign Matter	-	Not more than 2%,	Appendix 2.2.2.
Total Ash	-	Not more than 4%,	Appendix 2.2.3.
Acid insoluble ash	-	Not more than 1%,	Appendix 2.2.4.
Alcohol-soluble extractives	-	Not less than 2%,	Appendix 2.2.6.
Water-soluble extractives	-	Not less than 4%,	Appendix 2.2.7

TLC behaviour of ethanolic extract:

Solvent system	Spray/reagent treatment	No. of spots	Rf value
Toluene : Ethyl Acetate: Glacial Acetic acid(4:1:0.5)	On spraying plate withEthanoloc H_2SO_4 and heated for 5 minutes at 105^0 C	7	0.26, 0.39 0.49, 0.60 0.70, 0.76 0.87

Aa'maal-e-Adviya (Pharmacological Action):
Mughalliz-e-Mani, Muallid-e-Mani Moqawwvi-e-Bah, Muqawie dandan wa lissa

Aa'maal-e-Adviya (Pharmacological Action): Surat-e-Inzal, Zof-e-Bah, Kasrat-e-Ehtalam

Meqdar-e-Khorak (Dose): 5 -10 g

Side-effects / Adverse-effects: No significant side effects / Adverse-effectshave been observed.

Important formulations: Sufoofe sailan.

NANA

(Leaf)

*Mentha arvensis*is a species of flowering plant. It has a circumboreal distribution, being native to the temperate regions of Europe and western and central Asia, east to the Himalaya and eastern Siberia, and North America.

Other names:

a. Botanical Name: *Mentha viridis/ Mentha arvensis Linn*

b. Family: Lamiaceae

c. Bengali Name: Pudina

d. English Name: Spear-Mint.

Description

a. General**:** The drug Pudina consists of the aerial part of *Mentha viridis/ Mentha arvensis*belongs to Family –Lamiaceae a perennial, creeping aromatic herb of 30 to 90 cm high, widely cultivated throughout the plains of India and Bangladesh for culinary and medicinal purposes.

Fig: No 5. Pudina Leaf

b. Macroscopic**:** Drug consists of small chopped twigs, leaves opposite, decussate, shortly petiolate, petioles mm long, mature leaves 2.5 cm to 3.5 cm long and 1.5 to 2 cm broad, very minutely hairy, ovate, apex, acute coarsely dentate, comparatively smoother and darker upper surface; stem square, minutely hairy, light brown to brown; flowers in loose cylindrical, slender spikes; awl like, thorat of calyx naked, corolla smooth, seeds small, mucilaginious; aromatic odor and slightly pungent taste.

c. Microscopic**:**Transverse Section (TS) shows quadrangular outline with corner ridges and thin cuticle; epidermal cells tabular, multicellular uniserate trichomes present, cortex 8 to 9 cells deep below ridges, while 2 to 3 cells deep elsewhere, variable in size, endodermis single layer; pericycle broken; consisting of sclenchymatous cells, phloem 2 to 4 cells deep and made up of irregular shaped cells; xylem vessels 26 to 46 micron in dia and pith present.

Leaf: Midrib: TS shows protruded mid rib towards the lower surface; compact parenchymatous enclose a crescent- shaped vascular bundle and collenchymatous cells are absent.

Lamina: Dorsivetic; epidermal cell walls of both the surfaces in the surface view are wavy, stomata diacytic; covering trichomes present on the lower surface, uniseriate, 1 to 4 cells long, 42 to 350 micron in size with pointed apex; glandular trichomes 64 to 80 micron in diameter, with a single basal cell and a head of 8 cells found in depression of the epidermis; a single row of palisade ratio 6 to 8; vein islet number 18 to 20; stomatal index for upper epidermis 10 to 12, lower epidermis 15 to 30.

d. Powder**:**Blackish-brownfibrous, free flowing, characterized by the presence of uniseriate non-glandular hairs (112 to 350 micron), glandular trichomes 64 to 80 micron in diameter, diacytic stomata and epidermal cell walls wavy.

Parts used: Leaf

Habitat: Asian subcontinent, Europe and North America

Chemical Constituents: Essential oil (0.2 to 0.8 percent) containing terpene such as carvone (60%) and limonene (10%) as major constituents.

Afa'al-e-Adviya (Pharmacological activities):

Antibacterial Activity: The effects of the essential oils on the proliferation of *Helicobacter pylori*, *Salmonella enteritidis*, *Escherichia coli* O157:H7, methicillin-resistant *Staphylococcus aureus*, and methicillin sensitive *S. aureus* were examined. The essential oils inhibited the proliferation of each strain in liquid culture in a dose-dependent manner. In addition, they exhibited bactericidal activity in phosphate-buffered saline. The antibacterial activities varied among the bacterial species tested but were almost the same against antibiotic-resistant and antibiotic-sensitive strains of *H. pylori and S. aureus*. By using disc diffusion assay, the antimicrobial activity of essential oil sample extracted from *Mentha arvensis* (MA) var. piperacens cultivated in Thailand was evaluated against zoonotic enteropathogens including *Salmonella spp., E. coli O157, Campylobacter jejuni, and Clostridium perfringens* which are important for broiler export. The essential oil of, MA var. piperacens, showed promising antibacterial activity against the bacterias were tested.

Antifertility Activity: A study was carried out on antifertility investigation of the petroleum ether extract of the leaves of MA in male albino mice. In male albino mice at the doses 10 and 20 mg/day/mouse for 20, 40 and 60 days, when administered orally, showed a dose and duration dependent reduction in the number of offspring of the treated male mated with normal females. Negative fertility was observed in both dose regimens after 60 days of the treatment. The body weight and libido of the treated animals remain unaffected. However, a significant decrease in the weight of the testis, epididymis, cauda epididymal sperm count, motility, viability, and normal morphology of the spermatozoa was observed. The levels of serum protein, bilirubin, glutamic oxaloacetic transaminase, glutamic pyruvic transaminase and acid phosphatase, blood urea and hematological indices were unaltered throughout the course of the investigation. All the altered parameters were reversible following withdrawal of treatment. The results suggest that the petroleum ether extract of the leaves of MA possess reversible antifertility property in male mice.

Anti-allergic and Anti-inflammatory Activity: Anti-inflammatory activity and anti-allergic (histamine production by mast cells) of ethanolic and aqueous extracts (leaves, stem and roots) of MA were determined by histamineinduced paw edema in mice and histamine release inhibition test, respectively. MA (specifically, leaves) are rich source of secondary phytoconstituents, which impart their therapeutic effects against allergic and inflammatory diseases. Results for anti-allergic revealed that ethanolic extracts of leaf and root possessed marked inhibitory activity expressed as percentage inhibition, that is, 57% and 53%, respectively. Anti-inflammatory potential exhibited by ethanolic extracts of plant parts is leaf

= 68.30 > root = 48.80 > stem = 10.70% and compared with percentage inhibitory potential of standard drug, diclofenac sodium which caused 77.87% edema inhibition.

Mizaj (Temperament): Hot $2^0$and Dry 2^0

Musleh (Corrective): Katira Gum

Badal (Proximal substitute): Joen

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent Appendix 2.2.2.
Total Ash	: Not more than 14 percent Appendix 2.2.3
Acid-insoluble ash	: Not more than 4 percent Appendix 2.2.4
Alcohol soluble extractive	: Not less than 2percent Appendix 2.2.6
Water soluble extractive	: Not less than 7 percent Appendix 2.2.7
Essential Oil	: Not less than 0.2 percent Appendix 2.2.8

TLC: TLC of essential oil on silica gel "G plate" using hexane: ethyl acetate (90:10) shows spots at Rf 0.28, 0.33, 0.38, 0.49, 0.55, 0.66 and 0.88 on spraying with Vanillin-Sulphuric acid reagent and heating the plate for 15 minutes at 110^0C. Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Muzij Mawade Ghaleez, Kasire Riyah, Muqabbi-e-Meda, Modir e baul wa tams, Musakkine Dard, Qatile Kirm and Daffe Taaffun.

Muhall-e- Istamalat (Therapeutic uses): Zofe Meda; Nafakhe Shikam; Qai; Ehtabase-baul wa tams, Ishale Atfal and Nafe Haiza.

Meqdar-e-Khorak (Dose): 3-5gm

Side effects/ adverse effects: GI disturbances**.**

Important formulations: Jawarish-e-Pudina; Arq Pudina; Arq Azeeb; Jawarish-e-Anarain; Sikanjabeen Naanai; Jawarishe Kamuni.

NEEM

(Bark)

Azadirachta indica, commonly known as neem, nimtree or Indian lilac. It is one of two species in the genus *Azadirachta*, and is native to the Indian subcontinent, i.e. India, Nepal, Pakistan, Bangladesh, Sri Lanka, and Maldives. It is typically grown in tropical and semi-tropical regions. Neem trees also grow in islands located in the southern part of Iran.

Other names:

a. Botanical Name: *Azadirachta indica A.Juss*

b. Family: Maliaceae

c. Bengali Name: Nim

d. English Name: Margosa tree, Neem tree and Indian Lilac

Description

a. General**:**Bekhe Neem consists of dried bark of *Azadirachta indica* A.Juss belongs to Family –Meliaceae, a medium to large evergreen tree attaining a height of 15 to 20 m or more favourable conditions and found throughout the plains of India and Bangladesh up toan altitude of 900meters.

Fig:No 6: Neem plant and Bark

b. Macroscopic**:**Bark is available in quilled or curved pieces of varying sizes with a thickness of 0.25 to 0.50 cm ; outer surface irregular, rough, scaly, fissured, reddish-brown or greyish brown; inner surface, yellowish-brown with parallel striations; fracture, splintery fibrous, odor like that of saw dust; taste- bitter

c. Microscopic**:**Bark shows cork, cortex and phloem; cork generally 6 or 7 layers of polygonal and thin walled cells with reddish-brown contents; outer cortex of tangentially elongated large rectangular cells with tangentially elongated sclereids, singly or in groups in isolated patches; sclereids vary in size and wall thickness, distinctly striated, pitted and often associated with cells containing crystal, inner cortex of polygonal parenchymatous cells with bundles of sclerenchymatous fibres, thick wall with irregular lumen, secondary phloem composed of alternating tangential bands of bast fiber and parenchymatous tisses intercepted by uni to biseriate phloem rays, abundant starch grains present in parenchymatous cells of cortex and phloem; starch grain simple or more usually, compound with 2 to 3 components, hilum cleft or radiate, individual grains 5 to 20 micron; abundant prismatic crystals of calcium oxalate in cortex , of 10 to 15 micron also associated with phloem fibers; idioblasts with reddish-brown contents seen in cortex; cells with fat droplets seen in inner cortex and phloem.

d. Powder: Reddish brown, shows cork cells, numerous prismatic crystal of calcium oxalate both isolated and in association with phloem fibers, individual fibers with narrow lumen and elongated tapering ends, pitted macrosclereids with wide lumen and distinct striations, simple and copound starch grains with 2 or 3 components of 5 to 20 micron in size; parenchymatous cells large and occasionally filled with brown contents.

Parts used: Bark

Habitat: The Indian subcontinent i.e. India, Nepal, Pakistan, Bangladesh, SriLanka, Maldives and in tropical and semi-tropical regions.

Chemical Constituents: Tetranortriterpenoids, margocin, nimbidol, nimbolicin and azadirinin.

Afa'al-e-Adviya (Pharmacological activities):

Antidiabeticactivity:The pharmacological hypoglycemic action of Neem has examined in diabetic rats. After 24 hrs treatment, Neem 250mg/kg, reduced glucose (15%), cholesterol

(15%), triglycerides (32%). Urea (13%), creatinine (23%) and lipids (15%), Multiples dose study for 15 days also reduced creatinine, urea, lipids, triglycerides and glucose. In glucose tolerance test in diabetic rats with neem extract 250mg/kg demonstrated glucose levels were significantly less compared to the control group. It has significant effects on reduce glucose levels at 15th day in diabetic rats.

Anti-HIV/AIDS activity:In HIV/AIDS patients, a12-week oral administration of acetone water neem extract (IRAB) had a significant influence in vivo on CD4 cells (which HIV reduces) without any adverse effects in the patients. Of the 60 patients who completed treatment, 50 were completely laboratory- test compliant. The mean levels of CD4 cells increased by 159% in 50 patients, which is major increase; the no. of HIV/AIDS significant increases were experienced in body weight (12%), hemoglobin concentration (24%), and lymphocyte differential count (24%).

Antiulcer activity**:**Neem bark extract reduced human gastric acid hypersecretion, and gastro-esophageal and gastroduodenal ulcers.

Anti-tumour activity**:**A study on Neem has revealed a chemo preventive capability by regressing the hepatocarcinogenesis induced by diethyl Nitrosamine (DEN) / 2 Acetylaminofluorence (AAF) carcinogens on Spraque- Dawly rats.

Antifertility activity:Neem extracts administerd orally at the beginning of post-implantation stage resulted in pregnancy termination in rodents and primates, without permanent effect. Antihypertensive and antihypercholesteremic effect:Administration of aqueous extract of neem along with DOCA salt prevented the development of hypertension in rats. Administration of mature leaf extract decreased serum cholesterol significantly without changing serum protein, protein urea and uric acid levels in rats.

Mizaj (Temperament): Hot 1^0 and Dry 1^0

Musleh (Corrective): Honey, oil or Golmorich.

Badal (Proximal substitute): Nishinda

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 15 percent, Appendix 2.2.3.

Acid-insoluble ash	: Not more than 3 percent, Appendix 2.2.4
Alcohol soluble extractives	: Not less than 6percent, Appendix 2.2.6
Water soluble extractives	: Not less than 7 percent, Appendix 2.2.7

TLC: TLC of the alcoholic extract on percoatedsilica gel "G plate"(0.2 mm) using hexane: ethyl acetate (1:1) shows spots at Rf 0.08, 0.12,0.38, 0.19 (all violet), 0.25(mustard yellow), 0.33,0.39,0.46 (all light violet) and 0.82 (purple) on spraying with 1% Vanillin-Sulphuric acid reagent followed by heating the plate for 10 minutes at 105^0C. Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Musaffe Khoon, Dafe Humma, Qatile Krime and Amaa.

Muhall-e- Istamalat (Therapeutic uses): Amraze Jild and Fasade Dam.

Meqdar-e-Khorak (Dose):6-10 gm.

Side effects/ adverse effects: Headache, dizziness and abortion (pregnancy)

Important formulations: Habbe Musaffe khoon, Habbe Bawaseer; Majoon Musakkine Darde Rehem, Majoone Juzam and Qurse Neem.

NEEM

(Fruit)

Azadirachta indica, commonly known as neem, nimtree or Indian lilac. It is one of two species in the genus *Azadirachta*, and is native to the Indian subcontinent, i.e. India, Nepal, Pakistan, Bangladesh, Sri Lanka, and Maldives. It is typically grown in tropical and semi-tropical regions. Neem trees also grow in islands located in the southern part of Iran..

Other names:

a. Botanical Name: *Azadirachta indica A.Juss*

b. Family: Maliaceae

c. Bengali Name: Nim

d. English Name: Margosa tree, Neem tree, Indian Lilac

Description

a. General**:**Tukhme Neem consists of whole dried fruit of *Azadirachta indica A.Juss*, *Melia azadirachta* Linn belongs to Family –Meliaceae, a medium to large evergreen tree attaining a height of 15 to 20 m or more favorable conditions and found throughout the plains of India and Bangladesh up toan altitude of 900m.

Fig: No 7: Neem Plant and fruit

Macroscopic:Fruit**:** Glabrous, dark reddish brown, ovoid to ellipsoid drupes. 0.5 to 2 cm long, over one cm wide; indehiscent deeply wrinkled, enclosing a single seed in a brownish leathery pulp;odor strong, taste-bitter.

Seed:Brownish, dorsally convex; upto 1.5 cm long and 0.6 cm wide; seed coat thin; brownish shell-like, cracks to touch, inside of cracked pieces golden yellow; seed kernel, light brown, oily odour-strong; taste-bitter.

Microscopic: Fruit **:** Pericap well differentiated into epicarp, mesocarp and endocarp; epidermis more than one layered; squarish to rectangular cells containing yellowish-brown contents and oil droplets, mesocarp, many layered of loosely packed cells with large elongated sclereids scattered in outer layers; endocarp of two distinct layers, outer of closely packed lignified stone cells, inner fibrous , loose packed, lignified.

Seed:Seed kernel shows a thin brown testa, of isodiametric stone cells overlying integument of loosely packed parenchymatous cells; cotyledon consisting of parenchymatous cells containing abundant droplets.

d. Powder:Dark brown; shows abundant brachysclereids, columnar sclereids and pitted stone cells with wide lumen and distinct wall striations; groups of lignified fibers, thin walled, arranged in network of loose strands; parenchymatous cells of cotyledon containing aleurone grains and oil globules; fragments of testa showing distinctly striated isodiametric stone cells; a few scattered rosette crystal of calcium oxalate.

Parts used: Fruit

Habitat: The Indian subcontinent i.e. India, Nepal, Pakistan, Bangladesh, SriLanka, Maldives and in tropical and semi-tropical regions.

Chemical Constituents: Fixed oil containing diterpenoids and triterpenoids (limonoids), nimbin, gedunin, azadirachtin, nimbidinin and salanin.

Afa'al-e-Adviya (Pharmacological activities):

Antidiabetic activity: The pharmacological hypoglycemic action of Neem has examined in diabetic rats. After 24 hrs treatment, Neem 250mg/kg, reduced glucose (15%), cholesterol (15%), triglycerides (32%). Urea (13%), creatinine (23%) and lipids (15%), Multiples dose study for 15 days also reduced creatinine, urea, lipids, triglycerides and glucose. In glucose

tolerance test in diabetic rats with neem extract 250mg/kg demonstrated glucose levels were significantly less compared to the control group. It has significant effects on reduce glucose levels at 15th day in diabetic rats.

Anti-HIV/AIDS activity:In HIV/AIDS patients, a12-week oral administration of acetone water neem extract (IRAB) had a significant influence in vivo on CD4 cells (which HIV reduces) without any adverse effects in the patients. Of the 60 patients who completed treatment, 50 were completely laboratory- test compliant. The mean levels of CD4 cells increased by 159% in 50 patients, which is major increase; the no. of HIV/AIDS significant increases were experienced in body weight (12%), hemoglobin concentration (24%), and lymphocyte differential count (24%).

Anti-tumour activity**:** A study on Neem has revealed a chemo preventive capability by regressing the hepatocarcinogenesis induced by diethyl Nitrosamine (DEN) / 2 Acetylaminofluorence (AAF) carcinogens on Spraque- Dawly rats.

Antifertility activity: Neem extracts administerd orally at the beginning of post-implantation stage resulted in pregnancy termination in rodents and primates, without permanent effect. Antihypertensive and antihypercholesteremic effect: Administration of aqueous extract of neem along with DOCA salt prevented the development of hypertension in rats. Administration of mature leaf extract decreased serum cholesterol significantly without changing serum protein, protein urea and uric acid levels in rats.

A study was designed to evaluate the cellular and molecular mechanisms by which azadirachtin and nimbolide extract induce cytotoxic effects. The result of the study confirmed that these phytochemicals significantly suppressed the viability of cancer cells in a dose-dependent manner through cell cycle arrest induction at G_0/G_1 phase convoyed by p53-dependent p21 accumulation and downregulation of the cell cycle regulatory proteins

Mizaj (Temperament): Hot 1^0 and Dry 1^0

Musleh (Corrective): Honey

Badal (Proximal substitute): Nishinda leaf

Identity, purity and strength:

Foreign Matter : Not more than 2 percent, Appendix 2.2.2.

Total Ash	: Not more than 8 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 2 percent, Appendix 2.2.4.
Alcohol soluble extractives	: Not less than 16 percent, Appendix 2.2.6.
Water soluble extractives	: Not less than 19 percent, Appendix 2.2.7.

TLC: TLC of the alcoholic extract on percoated silica gel "G plate"(0.2 mm) using chloroform: ethyl acetone (18.5:1.5) shows spots at Rf 0.11 (greyish violet), 0.16(yellow),0.38, 0.19 (green), 0.24(violet), 0.29(grey),0.33 (mustard yellow),0.42 (pink),0.49 (greyish black), 0.57 (violet) and 0.76 (light purple) on spraying with 1% Vanillin-Sulphuric acid reagent and heating the plate for 10 minutes at 105^0C. Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Musaffe Khoon, Dafe Humma and Qatile Krime Amaa

Muhall-e- Istamalat (Therapeutic uses): Amraze Jild and Fasade Dam

Meqdar-e-Khorak (Dose): 6-10 gm

Side effects/ adverse effects: Dizziness, nausea and abortion.

Important formulations: Habbe Musaffe khoon, Habbe Bawaseer; Majoon Musakkine Darde Raham.

NEEM

(Leaf)

It's a leave of Neem Tree (*Azadirachta indica*).Neem tree is a large evergreen tree that grows up to 20 metres in height. There are many benefits of neem plant**.**Neem leaves grow alternately with 8-19 leaves present in each leaflet. The leaf has serrated edges and is 2-3 cm long. The terminal leaflet is often missing. The petioles are short. It bears white flowers that are 5-6 mm in size, protandrous resulting in male and female flowers in the same tree.

The fruits are 2-3 cm long and 0.6-0.8 cm broad. The hard, inner shell contains two to three seeds. The branches form a broad crown. In this article we will discuss about all these medicinal uses, benefits and side effects.

Other names:

a) Botanical name: *Azadirachta Indica*

b) Family: Meliaceae

c) Bengali name: Neem Pata

d) English name: Margosa Leave

Description:

a) General: The drug Neem (Leaf/Barg) consists of dried leaves of *AzadirachtaIndica* A. Juss. Syn. Melia *Azadirachta* Linn. (Meliaceae). A large tree native to India and widely distributed throughout Bangladesh. It occurs throughout the year. Flowering takes place during April - May and the fruits set upto July.

b) Macroscopic: The leaves are compound, imparipinnate, leaflets 5-8 cm long serrate, falcately lanceolate, acuminate, glabrous dark green above and paler beneath.

c) Microscopic: Transverse section of the leaf reveals consisting of two layers of palisade cells below the upper epidermis. The spongy parenchyma exhibits intercellular spaces and secretary cells which are specially abundant on the border line of palisade and spongy parenchyma. The mid-rib region shows ventral and dorsal ridges which are composed of cellenchymatous cells.

The upper epidermal cells are polygonal without stomata. The lower epidermis possesses many anomocytic type of stomata.

Transverse section of the rachis shows a single layer of epidermis, 6-8 layers of cells forming cortex in which secretary cells are found to be in large number. It has a distinct Phloem region, a xylem region and a pith region consisting of cells with intercellular spaces. The parenchyma cells of the cortical region of rachis show presence of rosette crystals of calcium oxalate.

Powder**:** The crude drug powder is green in colour with characteristic odour and very bitter taste. Microscopic examination shows the presence of cortical cells of the rachis, fragments of palisade cells, hairs, fibers, weed fibres, spiral and pitted vessels, epidermal tissue of the leaf with characteristic stomata and large pith eells, with intercellular spaces.

Parts used: Leave, Root, Bark, Seeds, oil

Habitat:

Neem is native to Indian sub contenent. It grows in all the countries in the subcontinent such as Bangladesh, Sri Lanka, Pakistan, and Nepal. It also grows in Australia, the Middle East, and in parts of Africa.

Phytoconstituents:

Alkaloids, glycosides, carbohydrates, steroid. Flavonoids, phenolic compounds, tannins, resins and saponins, iron, chloride, magnesium. Sulphate, potassium and sodium, meliacin-nimbolide, querectin and β-sitosterol, β-D-glucoside, n-hexacosanol, β-carotene.

Af'aal-e-Adviya (Pharmacological Activities):

Some of Af'aal-e-Adviya (Pharmacological activities) are describe here.

Anti-inflammatory: Plants or their isolated derivatives are in the practice to treat/act as anti-inflammatory agents. A study result has confirmed that extract of *A. indica* leaves at a dose of

200 mg/kg, p.o., showed significant anti-inflammatory activity in cotton pellet granuloma assay in rats. Other study results revealed that neem leaf extract showed significant anti-inflammatory effect but it is less efficacious than that of dexamethasone and study results suggest that nimbidin suppresses the functions of macrophages and neutrophils relevant to inflammation.

To study the effects of *A. indica* aqueous leaf extract on the expression of insulin signaling molecules and glucose oxidation in target tissue of high-fat and fructose-induced type-2 diabetic male rat. The oral effective dose of *A. indica* leaf extract (400 mg/kg body weight [b.wt]) was given once daily for 30 days to high-fat diet-induced diabetic rats. At the end of the experimental period, fasting blood glucose, oral glucose tolerance, serum lipid profile, and the levels of insulin signaling molecules, glycogen, glucose oxidation in gastro-cnemius muscle were assessed. Diabetic rats showed impaired glucose tolerance and impairment in insulin signaling molecules (insulin receptor, insulin receptor substrate-1, phospho-IRS-1Tyr632, phospho-IRS-1Ser636, phospho-AktSer473, and glucose transporter 4 [GLUT4] proteins), glycogen concentration and glucose oxidation. The treatment with *A. indica* leaf extract normalized the altered levels of blood glucose, serum insulin, lipid profile and insulin signaling molecules as well as GLUT4 proteins at 400 mg/kg b.wt dose. It is concluded from the present study that *A. indica* may play a significant role in the management of type-2 diabetes mellitus, by improving the insulin signaling molecules and glucose utilization in the skeletal muscle.

To examined the pharmacological hypoglycemic action of *Azadirachta indica* in diabetic rats. After treatment for 24 h, *Azadirachta indica* 250 mg/kg (single dose study) reduced glucose (18%), cholesterol (15%), triglycerides (32%), urea (13%), creatinine (23%), and lipids (15%). Multiple dose study for 15 days also reduced creatinine, urea, lipids, triglycerides and glucose. In a glucose tolerance test in diabetic rats with neem extract 250 mg/kg demonstrated glucose levels were significantly less compared to the control group, *Azadirachta indica* significantly reduce glucose levels at 15^{th} day in diabetic rats. *Azadirachta indica*serves as an important alternative source in the management of diabetes mellitus involved in reducing increased blood glucose during diabetes which should be examined further by oral hypoglycemic therapy.

To evaluated the *in-vivo* hypoglycemic effect of aqueous leaf extracts of *A. indica* in alloxan-induced white male albino mice. The blood glucose lowering effect of the extract was intraperitoneally and orally bioscreened in diabetic mice in serial dilutions of the extract at 25 mg/kgbwt, 48.4 mg/kg bwt, 93.5 mg/kgbwt, 180.9 mg/kgbwt and 350 mg/kgbwt. In both

routes, the extract lowered blood glucose at all dosages in a dose independent manner. The extracts contained flavonoids, tannins, sterols, saponins, anthraquinones and alkaloids. The antidiabetic activity may be attributable to these phytochemicals present in the plant extract. The study confirms the traditional use of this plant part in the treatment of diabetes mellitus. However, organic solvent extraction of the leaves of this plant should be done to compare effects of both organic and aqueous fractions.

Antibacterial Activity: Methanolic extract of *A. indica* (neem) leaves was tested for its antibacterial, antisecretory and antihemarrhagic activity against *Vibrio cholera*. The hexane chloroform and methanol extracts of *Azadirachta indica* were screened for antibacterial activity against *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus vulgaris*, *Micrococcus luteus*, *Bacillus subtilis*, *Enterococcus faecalis* and *Streptococcus faecalis*. It was reported that methanol extract was the most effective, chloroform moderately effective and hexane extract showed low antibacterial activity.

Oil extracted from leaves, seeds and bark gives a wide spectrum of antibacterial activity action against gram positive and gram negative microorganisms which including *M. tuberculosis* and streptomycin resistant strains. The photo-constituents like alkaloids, spooning, steroids, tennis, crude glycosides and flavonoids of neem plants was tested for antibacterial activity against pathogenic strains of *E. coli*, *Corynebacterium bovis* and *Staphylococcus aureus*. The outcomes were also supported by Hymete *et al*., (2005) they reported that flavonoids compounds have antimicrobial activity. Hafiza *et al*., (2002) reported that crude saponins also prevent the growth of the microbes. Metabolic extract and acetonic extracts of leaves of *Azadirachta indica* were screened for antibacterial activity against two different bacterial strains *i.e*. *E. coli* and *B. subtilus* and it was reported that methanolic plant extracts showed maximum antibacterial activity as compared to acetonic plant extracts.

Ethanolic extracts of neem leaves and stick of neem plant were screened for antibacterial activity on streptococcus mutans and it was reported that neem stick extracts had higher antibacterial properties than the leaves extracts.

Antifungal Activity: The aqueous and ethanolic extracts of *Azadirachta indica* leaves have been shown to have antidermatophytic activity against dermatophytes from the 88 clinical isolates with the help of agar dilution technique. In these studies, ethanolic extract showed more conspicuous activity as compared to aqueous extract. Antifungal characteristics was tested using methanolic and acetone extracts of *Azadirachta indica* against two different fungal strains *i.e*. *Aspergillus niger* and *Aspergillus fumigatus* and it was reported that

methanolic plant extract gives maximum antifungal activity as compared to acetonic extracts. The seed and leaf extracts of *Azadirachta indica* (neem) were screened for antifungal activity against dermatophytes and the Minimum Inhibitory Concentration (MIC) of (*Azadirachta indica*) neem seed extracts was found to be lower than that of neem leaf when screened against different species of Trichophyton and *E. floccosum*.

Antifungal activity of aqueous ethanolic and ethyl acetone extracts of (*Azadirachta indica)* neem leaves on growth of few human pathogens. *Aspergillus flavus, Candida albicans, Aspergillus terreus, Aspergillus fumigates, Aspergillus niger,* and *Microsporum gypseum in-vitro* using different concentration and it was reported that these extracts prevented the growth of the test pathogenic organism and the effect gradually increased with increase in concentration. Gedunin isolated from neem seed oil has been reported to have antifungal activity. The compounds of sulphur such as cyclic tetrasulphide and trisulphide isolated from the stem distillate of fresh, matured neem leaves shows antifungal activity against *Trichophyton mentagrophytes*.

Anticarcinogenic Activity: Neem leaf aqueous extract effectively suppresses oral squamous cell carcinoma induced by 7, 12-dimethylbenz [a] anthracene (DMBA), as revealed by reduced incidence of neoplasm. Neem may exert its chemopreventive effect in the oral mucosa by modulation of glutathione and its metabolizing enzymes. That neem leaf extract exerts its protective effect in N-methyl- N¢-nitro-N-nitroso-guanidine (MNNG) (a carcinogenic material)-induced oxidative stress has also been demonstrated by the reduced formation of lipid peroxides and enhanced level of antioxidants and detoxifying enzymes in the stomach, a primary target organ for MNNG as well as in the liver and in circulation.

Antimalarial Activity: Ball shaped wood scrapings which is soaked in 5% neem oil (*Azadirachta indica*) which is diluted in acetone and in 45 days the breeding of *Anopheles stephensi* and *Aedes aegypti* were controlled, when it is placed in water storage over head tanks. Nimbolide isolated from neem extracts shows the antimalarial activity by preventing the growth of plasmodium falciparum. Gedunin isolated from neem seed oil has been reported to show antimalarial activities. Both aqueous and alcohol extracts of bark and leaves of neem are effective antimalarial agents, particularly on chloroquine resistant strains (badam *et al*.,1987).This study was designed to know the antimalarial activity of the extract of the neem leaves (*Azadirachta indica* A. Juss) on the growth stages of *P. falciparum* FCR-3. The experimental laboratoric study used "post-test only with control design". RPMI 1640 used as culture medium for cultivation of *P. falciparum*. Treated drug was the extract of neem leaves dissolved in dimethyl-sulfooxide and prepared into 7 levels concentration

(3.125; 6.25; 12.5; 25; 50; 100 and 200 µg/mL). Negative control was culture medium with the malarial parasites. After cultured, synchronized, micromalarial culture were divided into control and treated groups then incubated in CO_2 Candle Jar at 37 ºC for 72 h. Each 8 h the percentage of parasitemia were measured for observing the activity of the extract on the growth stages of *P. falciparum*. After incubation, supernatant fluid was removed without disturbing the erythrocyte layer. Parasitemia was calculated by made the thin blood smear from the erythrocyte layer and stained with 10% Giemsa for 30 min. The antimalarial activity of the extract was calculated by counted the fifty percent of growth inhibition 50 (IC_{50}) using probit analysis. The result showed that the neem leaves extract can inhibit the growth of *P. falciparum* FCR-3 on mature schizont stage and the fifty percent inhibitory concentration (IC_{50}) of the extract was 3.86 µg/ml after 32 h incubating. The result indicated that the extract has an antimalarial activity on *P. falciparum* FCR-3 *in -vitro*.

Antiulcer Activity: The antiulcer effect was obtained with nimbidin in preventing acetyl salicyclic acid, indomethacin, serotonin-induced gastric lesions or streets as well as cysteamine induced duodenal ulcers or histamine. Leaf extract of *A. indica* (Neem) shows antiulcer effect was reported by Garg *et al*., and the inhibition of mucus depletion and most cell defragmentation as possible mechanism. Bandyopadhyay *et al*., isolates the phenolic glycoside as an active constituent, whose characterization and mechanism are under investigation. Therefore, *Azadirachta indica* offers another option for an effective antiulcer drug and which is safe.

Wound Healing Activity: The wound healing properties in small animal model, the excision and incision wound models were used and water, ethanol-water (1:1,v/v) and ethanol extracts were applied topically (15% w/w in ointment base). In the excision wound model, wound contraction, hydroxyproline content, DNA content, protein content, and nitric oxide levels were estimated after 14 days of topical treatment along with histopathological examinations. In the incision wound model, wound breaking strength was determined after 10 days of topical application of different extracts of AI. The animals treated with water extract of AI exhibited significant increment in rate of wound contraction (93.39%, $P < 0.01$), hydroxyproline content (13.31 ± 6.65 mg/g of dry tissue, $P < 0.001$), DNA content (20.99 ± 0.68 µg/100 mg of tissue, $P < 0.01$), protein content (100.53 ± 7.88 mg/g of wet tissue, $P < 0.01$) and nitric oxide level (3.05 ± 0.03 mMol/g of tissue, $P < 0.001$) as well as in wound breaking strength (289.40 ± 29.45 g, $P < 0.01$) when compared with vehicle control group which was also supported by histopathological studies. The water extract of stem bark of AI possesses significant wound healing property, validating its traditional use.

Antipyretic effects: Methanol extract of Neem leaves shows antipyretic effects when administrated orally in rabbits and rats (Parveen, 2013).

Antifungal effects: In a study doneby Mondaliet al.(2009) shows that the ethanolic extract of A.indica leaves is more effective against Rhizopus and Aspergillus compared to aqueous leaf extract. Aqueous and ethanolic extract of neem leaves were found effective against Candida albicans by which these organism shows sensitivity at the concentration of 15% and 7.5% on aqueous extract and the Minimum Inhibitory Concentration (MIC) was 7.5%. In the ethanolic extraction Candida albicans were found to be susceptible at the concentration of 15%, 7.5% and 3.75%, besides that; the MIC were 3.75% (Aarati et al., 2011).

Antibacterial: The methanol extract of of A.indica leaves shows antibacterial activity against Bacillus subtilis, Staphylococcus aureus, Proteus vulgaris, Salmonella typhi, and showed low activity on Pseudomonas aeruginosa but it is inffective against Escherichia coli. The petroleum ether and methanol extract of A.Indica leaves were highly effective against Candida albicans (Grover et al., 2011).

Antiviral: Neem leaves is found to be effective against Dengue virus type -2 in which it halts the replication of the virus itself in an invitro environment and in the laboratory animals (Rao et al., 1969).

Contraceptive: According to Bansal et al., (2010) the addition of sodium nimbidinate salt in aqueous form to semen of rat and human results in death of sperm in different percentage.Neem oil claimed spermicidal activity against rhesus monkey human spermatozoa in invitro condition, and when the oil is used in intra vaginally it prevents pregnancy in rats with concentration of 20 microlitre and in rhesus monkey and women were about 10 mililitre (ml) and the oral dose as low as 25 micro litre prevents implantation in rats and does not show any side effects upon repeated application. Similarly, Neem extract (Nim-76) is found to be effective than raw neem oil which act as spermicidal with no alteration in hormonal values. According to Khillare and Shrivastav (2003), aqueous extract of old and tender leaves shows 100% of mortality of the sperms without altering its morphology (head, mid-piece and tail).

Hepatoprotective: Upon administration of Azadirachta indica, it stabilize the levels of Serum glutamate oxaloacetate transaminase(SGOT), Serum Glutamate Pyruvate Transaminase (SGPT), Alkaline Phosphatase (ALP), Serum bilirubinand and elevates total protein amount. Thus, this plantclearly notify the improvement of the functional status of liver cells (Gomase et al., 2011).

Antihyperglycemic agent: A dose of 250 mg/kg of aqueous extract of fresh leaves of Neem was administrated orally onto streptozotocin induced and its associated retinopathy in rats for 16 weeks and resulted in significant fall in blood glucose level and serum lipids and there were slight increase in HDL level. The slight increase indicates the extract as positive effect in lipid metabolism of diabetic rats.

Temperament: Hot 1^0 Dry 1^0

Musleeh (Corrective):

Not require. But precautionary measures should follow during taking Neem preparation.

Badal (Proximal substitute): No proximal substitute is identified.

Identity, purity and strength:

Foreign Matter	- Not more than 2%,Appendix 2.2.2.
Total Ash	- Not more than 12%, Appendix 2.2.3.
Acid insoluble ash	- Not more than 6%, Appendix 2.2.4.
Alcohol-soluble extractives	- Not less than 6%, Appendix 2.2.6.
Water-soluble extractives	- Not less than 23%, Appendix 2.2.7.

TLC behaviour of petroleum ether ($60\text{-}80^0$) extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Benzene:Ethyl acetate (4:1)	2% Ethanolic H_2SO_4, heat the chromatogram for 10 mints. at 105^o	2	0.34, 0.84

Aa'maal-e-Adviya (Pharmacological Action):

Musafti-e-Dam, Daf-e-Taaffun, Mohallil-e-Waram, Daf-e-wa-Taqleel-e-Ziabetus, Maqavvi-e-Quwwat-e-Mdafeyat, Daf-e-Sartan, Tasfeyeh-e-Samyat-e-Badan, Maqavvi-e-Kabed, Qatel-e-Dedan, Mohafez-e-Kabed

Mahall-e-Istemalat (Therapeutic use):

Jarb, Hikka, Fasad-ud-Dam, Ziabetus Sukkari, Humma-e-Muzmeen, Sartan, Eltehab-e-Kabed, Shahem-e-Kabed, Deadan-e-Amya, Bysh-e-Hysasiyat,

Zof-e-Quwwat-e-Mdafeyat.

Meqdar-e-Khorak (Dose): 6-10 g

Side-effects / adverse-effects:

Here are the things one must expect along with the good things.

1. Liver and kidney damage: The excess consumption of the neem can cause damage to the organs. So, care must be taken to use the neem in moderation.
2. Increased fatigue: People who are already fatigued must avoid consuming neem as it will worsen the fatigue.
3. Immune system overdrive: One of the most serious side-effects is the way the body immune system goes into overdrive when one overdoses on neem when treating ailments.
4. Dangerous for those who have had an organ transplant: patients who have undergone organ transplant will have immunosuppressant medication to keep their own immune system from attacking the new organs. If they have Azadirachta Indica, it will cause the immune system to become enhanced and attack the new organs.
5. Lowers blood sugar: The neem will cause a severe drop in the blood sugar levels. A little neem oil will help control the blood sugar levels but when taken in excess it will cause dizziness and numbness. Sometimes, the person may go into a coma.
6. Causes stomach irritation: The neem preparation can cause irritation in people who are sensitive. So, one must check the medical history of the person before administering neem preparations.
7. Allergic reaction: People who have allergy will aggravate their situation when they use neem oil.
8. Death in infants: Certain substances present in neem cause Reye's syndrome in infants when they touch neem oil. If the child has even the smallest dose of neem oil, they will die.
9. Infertility and miscarriage: The farmers use neem preparations to cause infertility in the pests. This will keep the pest population under control. They disrupt the direction of the sperm and so they cannot conceive. When women

are overexposed to Azadirachta Indica, their body rejects the sperm and this results in miscarriage.

The neem extract is strong enough to kill pests and insects. So, must make sure that person do not have excess of the neem tree preparation. If feel nauseous or ill after taking neem preparations, consult health care provider at once.

Important formulations:

Marham-e-Jadwar, Habb-e-SiyahChashm, Habb-e-Surkhbada, Araq-e-Juzam, Araq-e-Musaffi-e-KhoonQawi.

NEEM

(Seed)

This drug is the seed of Neem tree **(***Azadirachta indica* A. Juss. Syn. *Melia azadirachta*Linn. (Meliaceae).

Other names:

a) Botanical name: *Azadirachtu indica* A. Juss. Syn. *Melia azadirachta* Linn.

b) Family: Meliaceae

c) Bengali name: Nim Beej

d) English name: Nim tree Seed. Indian Lilac, Margosa tree Seed

Description:

a) General: Neem tree belongs to the family Meliaceae which is found in abundance in tropical and semitropical regions like India, Bangladesh, Pakistan, and Nepal. It is a fast-growing tree with 20–23 m tall and trunk is straight and has a diameter around 4-5 ft. The leaves are compound, imparipinnate, with each comprising 5–15 leaflets. Its fruits are green drupes which turn golden yellow on ripening in the months of June–August.

b) Macroscopic:Seeds are ovoid to ellipsoid, 8 to 15 mm in length and 6 mm to 10 mm diameter at center, cream to brownish in colour; rough textured, characteristic Neem odour; seed coat hard and brittle, can be decorticated with ease, cotyledons are thick, tleshy; 100 seeds weighing around 14 to I6g.

c) Microscopic:Seeds oval to spherical in outline, separated into testa, tegman and cotyledon; stone cclled testa is compactly packed, thick walled, without lumen, lignified, polygonal, 15 to 18 layered, hard, does not swells in glycerin-water solution: tegman cells thin walled, smooth, freely packed, parenchymatous, orange brownish in colour, 5 to 7 layered, oval shaped, averages 90 to 135 micron in length, after imbibing gets separated from the cotyledon, transparent, hyaline without inclusion, parenchymatous 2 to 3 layered nucellar cell boundary found always attached to the tegman. A continuous layer separates tegman from cotyledon; cotyledon cells are turgid with full of cytoplasm and oil globules, thin walled, compactly packed, many layered, parenchymatous cells, polygonal, polyhedral, ranges from 180 to 360 micron in diameter.

Powder:

Fine, cream to brown-coloured; characteristic Neem odour, bitter in taste; oily in nature, leaves stains on paper; microscopy reveals several turgid, scattered oil globules ranging from 30 micron to 180 micron in diameter; some transparent, scanty parenchymatous cells with

freely scattered entire or broken seed coat cells along with long fibres are also found. No tannin, no effervescence, fixed oil present.

Part used: Leave, Bark, Fruit, Flower, Seed

Habitat:

Neem likes open woodlands, grasslands, floodplains, riparian zones, coastal sites and other disturbed natural vegetation. It can grow in semi-shade or full sun. It prefers dry or moist soil and can tolerate drought. It cannot survive freezing temperatures or being waterlogged. It found in abundance in tropical and semitropical regions like India, Bangladesh, Pakistan, Nepal etc.

Phytoconstituents:

The Neem seeds hold valuable constituents including gedunin, Terpenoids, fixed oils, fatty acids and azadirachtin.

Azadirachta indica L. (Neem) shows therapeutics role in health management due to rich source of various types of ingredients. The most important active constituent is azadirachtin and the others are nimbolinin, nimbin, nimbidin, nimbidol, sodium nimbinate, gedunin, salannin, and quercetin.

Leaves contain ingredients such as nimbin, nimbanene, 6-desacetylnimbinene, nimbandiol, nimbolide, ascorbic acid, n-hexacosanol and amino acid, 7-desacetyl-7-benzoylazadiradione, 7-desacetyl-7-benzoylgedunin, 17-hydroxyazadiradione, and nimbiol. Quercetin and ß-sitosterol, polyphenolic flavonoids, were purified from neem fresh leaves and were known to have antibacterial and antifungal properties.

Af'aal-e-Adviya (Pharmacological Activities):

Mechanisn of Action: of active Phytoconstituents: Neem (*Azadirachta indica*), a member of the Meliaceae family, has therapeutics implication in the diseases prevention and treatment. But the exact molecular mechanism in the prevention of pathogenesis is not understood entirely. It is considered that *Azadirachta indica* shows therapeutic role due to the rich source of antioxidant and other valuable active compounds such as azadirachtin, nimbolinin, nimbin, nimbidin, nimbidol, salannin, and quercetin.Possible mechanism of action of *Azadirachta indica* is presented as follows.

Neem (*Azadirachta indica*) plants parts shows antimicrobial role through inhibitory effect on microbial growth/potentiality of cell wall breakdown. Azadirachtin, a complex tetranortriterpenoid limonoid present in seeds, is the key constituent responsible for both antifeedant and toxic effects in insects. Results suggest that the ethanol extract of neem leaves showed *in vitro* antibacterial activity against both *Staphylococcus aureus* and MRSA with greatest zones of inhibition noted at 100% concentration.

1. Neem plays role as free radical scavenging properties due to rich source of antioxidant. Azadirachtin and nimbolide showed concentration-dependent antiradical scavenging activity and reductive potential in the following order: nimbolide > azadirachtin > ascorbate [20].
2. Neem ingredient shows effective role in the management of cancer through the regulation of cell signaling pathways. Neem modulates the activity of various tumour suppressor genes (e.g., p53, pTEN), angiogenesis (VEGF), transcription factors (e.g., NF-κB), and apoptosis (e.g., bcl2, bax).
3. Neem also plays role as anti-inflammatory via regulation of proinflammatory enzyme activities including cyclooxygenase (COX), and lipoxygenase (LOX) enzyme.

Some of Af'aal-e-Adviya (Pharmacological Activities) are described here.

Anti-inflammatory: Experimentation was made to evaluate the analgesic activity of neem seed oil on Albino rats and results of the study showed that neem seed oil showed significant analgesic effect in the dose of 1 and 2 mL/kg and oil has dose-dependent analgesic activity. Another study was made to investigate the anti-inflammatory effect of Neem Seed Oil (NSO) on albino rats using carrageenan-induced hind paw edema and results revealed that NSO showed increased inhibition of paw edema with the progressive increase in dose from 0.25 ml to 2 mL/kg body weight. At the dose of 2 ml/kg body weight, NSO showed maximum (53.14%) inhibition of edema at 4th h of carrageenan injection.

Antidiabetic and Antihyperlipaemic: Bopana et al., (1997) reported antidiabetic and anti-hyperlipaemic effects of neem seed kernel powder on alloxan diabetic rabbits. In alloxan diabetic rabbits there was a significant ($P<0.001$) increase in fasting blood glucose and urine sugar and there was a significant decrease ($P<0.001$) in body weight and total haemoglobin content. There was a significant increase in body weight and haemoglobin level, and a significant decrease in Fasting Blood Glucose (FBG) and urine sugar in diabetic rabbits treated with NP, glibenclamide, insulin and in combination of NP and glibenclamide.

Antibacterial Activity: Oil extracted from leaves, seeds and bark gives a wide spectrum of antibacterial activity action against gram positive and gram negative microorganisms which including M. tuberculosis and streptomycin resistant strains. The photo-constituents like alkaloids, spooning, steroids, tennis, crude glycosides and flavonoids of neem plants was tested for antibacterial activity against pathogenic strains of E. coli, Corynebacterium bovis and Staphylococcus aureus. The outcomes were also supported by Hymete et al., (2005) they reported that flavonoids compounds have antimicrobial activity. Hafiza et al., (2002) reported that crude saponins also prevent the growth of the microbes. Metabolic extract and acetonic extracts of leaves of Azadirachta indica were screened for antibacterial activity against two different bacterial strains i.e. E. coli and B. subtilus and it was reported that methanolic plant extracts showed maximum antibacterial activity as compared to acetonic plant extracts.El-Mahmood et al., 2010 observed the antibacterial effects of crude extracts of neem seed against pathogenic involved in the infection of eyes and ear. The pure, ethanol, acetone and methanol extracts of neem were screened against bacterial strains i.e. E. coli, B. subtitles, Salmonella typhus, Pseudomonas, Staphylococcus aurous, and Klebsiella pneumonia and Staphylococcus epidermitis for various antibacterial activities. They reported that the neem extracts of acetone showed the maximum antibacterial activity as compared to other solvent extracts. Neem seed oil gives bactericidal activity against pathogenic bacterial strains. The solvent and crude aqueous extracts of A. indica (Neem) were screened against pathogenic bacterial strains, wherein crude extracts shows better outcomes. Ethanolic extracts of neem leaves and stick of neem plant were screened for antibacterial activity on streptococcus mutans and it was reported that neem stick extracts had higher antibacterial properties than the leaves extracts.

Antifungal activity: The seed and leaf extracts of Azadirachta indica (neem) were screened for antifungal activity against dermatophytes and the Minimum Inhibitory Concentration (MIC) of (Azadirachta indica) neem seed extracts was found to be lower than that of neem leaf when screened against different species of Trichophyton and E. floccosum.Antifungal activity of aqueous ethanolic and ethyl acetone extracts of (Azadirachta indica) neem leaves on growth of few human pathogens. Aspergillus flavus, Candida albicans, Aspergillus terreus, Aspergillus fumigates, Aspergillus niger, and Microsporum gypseum in-vitro using different concentration and it was reported that these extracts prevented the growth of the test pathogenic organism and the effect gradually increased with increase in concentration. Gedunin isolated from neem seed oil has been reported to have antifungal activity.

Antimalarial Activity: Gedunin isolated from neem seed oil has been reported to show antimalarial activities. Both aqueous and alcohol extracts of bark and leaves of neem are effective antimalarial agents, particularly on chloroquine resistant strains (badam et al., 1987).

Wound Healing Activity: The wound healing properties in small animal model, the excision and incision wound models were used and water, ethanol-water (1:1, v/v) and ethanol extracts were applied topically (15% w/w in ointment base). In the excision wound model, wound contraction, hydroxyproline content, DNA content, protein content, and nitric oxide levels were estimated after 14 days of topical treatment along with histopathological examinations. In the incision wound model, wound breaking strength was determined after 10 days of topical application of different extracts of AI. The animals treated with water extract of AI exhibited significant increment in rate of wound contraction (93.39%, $P < 0.01$), hydroxyproline content (13.31 ± 6.65 mg/g of dry tissue, $P < 0.001$), DNA content (20.99 ± 0.68 μg/100 mg of tissue, $P < 0.01$), protein content (100.53 ± 7.88 mg/g of wet tissue, $P < 0.01$) and nitric oxide level (3.05 ± 0.03 mMol/g of tissue, $P < 0.001$) as well as in wound breaking strength (289.40 ± 29.45 g, $P < 0.01$) when compared with vehicle control group which was also supported by histopathological studies. The water extract of stem bark of AI possesses significant wound healing property, validating its traditional use.

Analgesic effect: In a Study done by Kumar et al., (2012) by using albino rats, it was found that Neem seed oil (NSO) of 2ml/kg body weight is comparable to morphine with a dose of 1mg/kg body weight, NSO produces a better analgesic effect than morphine withminute of interval and in another similar study done by Srinivasa et al., (2014) it were stated that neem resembles indomethacine.

Antipyretic effects: Methanol extract of Neem leaves shows antipyreticeffects when administrated orally in rabbits and rats (Parveen, 2013)

Antiviral : Neem leaves is found to be effective against Dengue virus type -2 in which it halts the replication of the virus itself in an invitro environment and in the laboratory animals (Rao et al., 1969). The aqueousextract of Neem bark were found to be effective against Herpes simplex virus type 1 by blocking its entry into natural target cell (Tiwari et al., 2010),

Mizaj (Temperament): Hot 2^o- Dry 2^o

Musleeh (Corrective): Not require.

Badal (Proximal substitute): No proximal substitute is identified.

Identity, purity and strength:

Foreign Matter	-	Not more than 2%,	Appendix 2.2.2.
Total Ash	-	Not more than 5%,	Appendix 2.2.3.
Acid insoluble ash	-	Not more than 1%,	Appendix 2.2.4.
Alcohol-soluble extractives	-	Not less than 15%,	Appendix 2.2.6.
Water-soluble extractives	-	Not less than 9%,	Appendix 2.2.7
Fixed oil	-	Not less than 18%,	Appendix 2.2.8

TLC behavior of ethanolic extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Pet. Ether: Diethyl ether: Acetic acid (80 : 20 : 1)	On spraying plate with10%aquous H_2S0_4 and and heated for 30 minutes at 1lOO^C	*6*	*0.12* *0.14* *0.29* *0.50* *0.81* *0.90*

Aa'maal-e-Adviya (Pharmacological Action):

Musaffi-e-Dam, Moharrik, Daf-e- Humma, Dafe-Taffun, Qatil-e-Kirm

Mahall-e-Istemalat (Therapeutic use):

Jarb-o-Hikka, Bahaq, Bars, Namash, Awram-e-Khabisa, Busoor, Qurooh

Meqdar-e-Khorak (Dose): 5 gm

Side-effects / Adverse-effects: No significant side effects / Adverse-effectshave been observed.

Special Precautions and Warnings:

Pregnancy and breast-feeding: Neem oil and neem bark are likely unsafe when taken by mouth during pregnancy. They can cause a miscarriage.

“Auto-immune diseases” such as multiple sclerosis (MS), lupus (systemic lupus erythematosus, SLE), rheumatoid arthritis (RA), or other conditions: Neem might cause the immune system to become more active. This could increase the symptoms of auto-immune diseases. In any one of these conditions, it’s best to avoid using Neem.

Diabetes: There is some evidence that Neem can lower blood sugar levels and might cause blood sugar to go too low.

Infertility: There is some evidence that Neem can harm sperm. It might also reduce fertility in other ways. Organ transplant: There is a concern that Neem might decrease the effectiveness of medications that are used to prevent organ rejection. Do not use Neemin such situations.

Surgery: Neem might lower blood sugar levels. There is a concern that it might interfere with blood sugar control during and after surgery. Stop using neem at least 2 weeks before a scheduled surgery.

Important formulations: Habb-e-Neeb

OOD HINDI

(Heart wood)

This speices is globally distributed in the Eastern Himalayas of India, Bangladesh, Myanmar and South East Asia. Within India, it has been recorded in Meghalaya (Khasi, Garo, Naga and Cachar hills), Assam (Martaban Hills), Nagaland, Manipur and Tripura.

Other names:

a. Botanical Name: *Aquilaria agallocha*Roxb

b. Family: Thymelaeaceae

c. Bengali Name: Agar

d. English Name: Eagle Wood

Description

a. General:The drug Ood Hindi consists of dried heart wood of *Aquilaria agallocha* Roxb belongs to Family –Thymelaeaceae, a large evergreen tree, distributed in North East part of India and Bangladesh.

Fig: No 25: Agar Wood Plant and Bark.

b. Macroscopic: Drug available in cut pieces, dark brown to nearly black in color; fracture , hard; having characteristic smell.

c. Microscopic**:** Shows mostly uniseriate sometimes biseriate xylem rays; vessels isolated having simple pitted thickening and filled with dark brown contents; xylem fibers short having narrow lumen occupying a major portion of wood; xylem parenchyma less in number and simple pitted; included phloem tissues in pockets partially disorganized; leaving large circular or oval holes; containing collapsed and broken tissues.

d. Powder**:**Dark brown, shows numerous aseptate fibers, simple pitted vessels with dark brown contents.

Parts used: Wood

Habitat: Bangladesh and India

Chemical Constituents: In total, 88 new 2-(2-phenylethyl)chromone compounds (1–88) have been isolated from agarwood and genus Aquilaria plants (Figures 1–5). Yang et al. carried out a bioassay-guided isolation strategy from A. sinensis, resulting in seven new 2-(2-phenylethl)chromone derivatives (1–7) and a new 2-(2-phenylethenyl)chromone being obtained from an ethanol (EtOH) extract. The investigation of EtOH extract obtained another three 2-(2-phenylethl)chromones (9–11) and eight derivatives (12–19) from different fractions . Liao et al. reported seven new 2-(2-phenylethyl)chromone derivatives (20–26), including a chlorinated one (23) from the ethyl acetate (EtOAc) fraction of artificial agarwood (A. sinensis).

Afa'al-e-Adviya (Pharmacological activities):

Neural Activity: Agarwood has been traditionally used as a medicine for tranquilizing and reducing excitement in China, Southeast Asia, and the Middle East for centuries. Modern pharmacological studies have demonstrated that agarwood has an active effect on the nervous system. Okugawa et al. determined that a benzene extract of *A. malaccensis* agarwood reduced spontaneous motility, prolonged hexobarbiturate-induced sleeping time, and decreased rectal temperature, whereas petroleum ether, chloroform, or water extracts did not have that effect. A further bio-guided isolation of a benzene extract found that jinkoh-eremol and agarospirol were the main active constituents. Takemoto et al. reported that agarwood essential oil sedated mice through vapor inhalation, in which the main volatile constituents were benzylacetone, α-gurjunene, and (+)-calarene. As benzylacetone had a sedativeeffect, a number of derivatives were synthesized and assessed for a sedative effect. The results demonstrated that benzylacetone-like compounds had sedative activities, and their intensities

varied depending on the functional group in the carbon chain, the substituent in the benzene ring, and their combinations.

Our recent studies showed that both the ethanol extract and essential oil of agarwood, induced by the whole-tree agarwood inducing technique in *A. sinensis* trees, had a sedative-hypnotic effect, where its potential mechanism is related to regulating the gene expression of $GABA_A$ receptors and potentiating the $GABA_A$ receptor function. Agarofuran, derived from agarwood essential oil, was reported to have anxiolytic and anti-depression activity in mice. To explore a potential drug for treating anxiety and depression, a series of agarofuran-like derivatives were synthesized and the activity screened, among which, buagafuran was an effective compound for anti-anxiety and anti-depression, with low toxicity and a high safety coefficient. The potential mechanism might be through modulating central neurotransmitters, such as dopamine.

A metabolic study showed that buagafuran could be transformed to hydroxy metabolite and carbonyl one in a human liver microsome, where carbonyl metabolite was the main one. Until now, phase II clinical trials are being conducted on buagafuran. Furthermore, many other activity screening results have also shown that compounds from agarwood have an effect on neural activity.

Gastrointestinal Regulation: Pharmacological studies showed that agarwood and the leaves of *A. sinensis* trees have a gastrointestinal regulating effect. Our studies demonstrated that the agarwood ethanol extract significantly improved intestinal peristalsis, enhanced gastric emptying, and inhibited gastric ulcer. Li et al. reported that the ethanol extract of agarwood and *A. sinensis* leaves enhanced intestinal propulsion. Kakina et al. reported that leaves of *A. sinensis* trees induced laxation via acetylcholine receptors on loperamide-induced constipation in mice. The acetone extract of *A. sinensis* leaves had a laxative effect without causing diarrhea, in which genkwanin 5-*O*-*β*-primeveroside was the active constituent, whereas the methanol extract did not have the laxative effect. The ethanol extract of *A. sinensis* leaves had a laxative effect without causing diarrhea in a rat model of low-fiber diet-induced constipation. Mangiferin and genkwanin 5-*O*-primeveroside were the two major bioactive compounds. Additionally, benzylacetone, an active compound from essential oil, had the effect of enhancing appetite. Even though agarwood on alleviating abdominal discomfort has been widely used for centuries, the gastrointestinal regulating effect, especially on a specific disease, is not completely clear.

Antibacterial and Antifungal: The original use of agarwood was for anticorrosive deodorization in ancient China, as well as Southeast Asian countries. In Thailand, agarwood has been used for a long time as a traditional treatment for infectious diseases such as diarrhea and skin diseases. Chen et al. found that agarwood essential oil derived from *A. sinensis*, regardless of whether it originated from artificial or natural agarwood, had inhibitive activities towards *Bacillus subtilis* and *Staphylococcus aureus*. Extracts of agarwood (*A. crassna*), isolated by water distillation, supercritical fluid carbon dioxide, and supercritical fluid carbon dioxide with ethanol as the co-solvent, showed antimicrobial activities against *S. aureus* and *Candida albicans*, but were not against *Escherichia coli*. Sirilak et al. found that an aqueous extract of *A. crassna* leaves possessed an in vitro antibacterial action against *Staphylococcus epidermidis*, causing bacterial cells to swell and distort, inhibiting the biofilm formation, and leading to cell wall rupture.

Analgesic Effect: Wang et al. found that chloroform extracts of agarwood prolonged the pain threshold induced by hot plate, and reduced the times of writhing reactions. Jinkoh-eremol and agarospirol may be the active compounds, and jinkoh-eremol's analgesic effect could be blocked by naloxone (a opioid antagonist), whereas agarosporol was weakly effected by naloxone . At the same time, jinkoh-eremol and agarospirol could inhibit D_2 receptor binding and 5-HT_{2A}receptor binding. Additionally, it showed strong inhibitory activity in A23178- and antigen-induced degranulation assay, with IC_{50} values of 1.7 nM and 11 nM, respectively.

Antiasthma: The antiasthma effect of agarwood has been traditionally used in China, and can be found in the latest Chinese Pharmacopoeia. However, to our knowledge, only one study found that an ethanol extract of agarwood and *A. sinensis*leaves could inhibit asthma induced by histamine phosphate in guinea pig.

Mizaj (Temperament): Hot 2^0 and Dry 2^0

Musleh (Corrective): Rose water, Sekanjabin and Korpoor**.**

Badal (Proximal substitute): White chandan, Daruchini, Lobong and Jafran.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 13 percent, Appendix 2.2.3.

Acid-insoluble ash	: Not more than 0.5 percent, Appendix 2.2.4.
Alcohol soluble extractive	: Not less than 1percent, Appendix 2.2.6.
Water soluble extractive	: Not less than 2percent, Appendix 2.2.7.

TLC: TLC of alcoholic extract on silica gel "G plate" using Toluene: Ethyl acetate (9:1) shows in visible light two spots at Rf. 0.17 and 0.27 (both light brown). Under UV (366 nm) five fluorescent zones appears at Rf 0.17, 0.27, 0.36, 0.57 and 0.80 (both blue). On the exposure to iodine vapour eight spots appear at Rf 0.05, 0.11, 0.15, 0.24, 0.33, 0.57, 0.73 and 0.80(all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate for 10 minutes at 105^0C shows three spots at Rf. 0.13, 0.18; 0.25; 0.37 and 0.59 (all violet).

Aa'a mal-e-Adviya (Pharmacological Action): Muqabbie- Asab (Nervine Tonic); Mustahi (Appetizer); Dafe-Taffun (Anseptic) and Munaffis-e-Balgham (Expectorant).

Muhall-e- Istamalat (Therapeutic uses): Zofe-e-Asab (Neurasthenia); Zofe-Isteha (Anorexia); Sual (cough); Amraz-e-Meda (Gastric Diseases).

Meqdar-e-Khorak (Dose):1-3 gm

Side effects/ adverse effects: Excess may be harmful for hot temperamental people.

Important formulations: Jawarish-Ood Shireen; Jawarish Ood Tursh; Jawarish Jalinoos; Khamira Abresham Hakim Arshad Wala.Majune Khubsul Hadid; Majune Khador;Dawaul Misk Motadil; Majoone Salab; Dawaul Kurkum Kabir.

PALASH PAPRA

(Seed)

Butea monosperma is a species of *Butea* native to tropical and sub-tropical parts of the Indian Subcontinent and SoutheastAsia,ranging across India, Bangladesh, Nepal, Srilanka, Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia,and western Indonesia.Common names include flame-of-the-forest and bastard teak.

Other names:

a. Botanical Name: *Butea monosperma* kuntze.

b. Family: Papilionaceae

c. Bengali Name: Polash Gach

d. English Name: Bengle Kinotree

Description

a. General:The drug Palaspapra consists of dried seed of *Butea monosperma Kuntz* belongs to Family Papilionaceae, a medium sized tree with a somewhat crooked trunk,12 to 15 m high with irregular branches. Commonly found throughout the greater part of the India up to 915 m altitude.

Fig: No: 26: Palash Papra

b. Macroscopic**:**Seed flat, kidney shaped, 2.5 to 4 cm long; 1 to 3 cm wide; dark reddish-brown, thin, glossy. Hilum clear, situated near middle of concave edge of seed. Odour-faint; taste-slightly acrid and bitter.

c. Microscopic**:**Shows a wide zone of testa, consisting of a layer of palisade cells, a row of bearer cells and many layers of parenchymatous cells; palisade cells compactly arranged, coloumnar shaped and covered with thick cuticle. Followed by a single row of bearer cells, parenchymatous layers consisting of many rows of cells, filled with reddish –brown contents; a number of vascular bundlesoccur in a row, in middle region of parenchymatous zone; cotyledons consists of a single layered epidermis, composed of square to oval cells, covered with cuticle; mesophyll cells bear hyaline walls, oval to irregular shaped with small intercellular spaces; simple, oval to round, starch grains with concentric striations and centric hilum, compound grains having 2 to 4 components measuring 8 to 16 i` in dia, present in cotyledons.

d. Powder:Cream or grey; shows fragments of testa, bearer cells, numerous simple oval to round starch grains with concentric striations and centric hilum and also compound starch grains having 2 to 4 components, measuring 8 to 16 i` in diameter.

Parts used: Seed

Habitat:India Bangladesh , Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia, and western Indonesia.

Chemical Constituents: Fixed oil, Enzymes and small quantities of Resins and alkaloids.

Afa'al-e-Adviya (Pharmacological activities): It is a potent astringent, and orally given gum juice used to treat diarrhea and dysentery; phthisis and hemorrhages from stomach and bladder. A gum juice is applied to bruises and inflammations and ringworm [Nadkarni and Nadkarni, 1976]. In unani medicine, it is used as aphrodisiac, tonic to liver; used to treat thoracic diseases [Agharkar, 1991].

Bark is used to treat liver disorders, dysmenorrhoea and gonorrhea in Unani medicine [Mhasker ***et al.*, 2000].** The leaves used as astringent, tonic, diuretic and aphrodisiac properties [Mhasker ***et al.*, 2000].** Externally applied leaves juice used to boils, pimples

tumours haemorrhoids and orally given juice to treat flatulence, colic, worms infestations and piles [Nadkarni and Nadkarni, 1976].

The root bark is utilized as an aphrodisiac and as an analgesic and anthelmintic. It is also used to treat, piles, ulcers, tumour and dropsy [Dhiman, 2003]. Seeds are used as anthelmintic for roundworms. Externally applied paste made with lemon juice to treat skin diseases [Agharkar, 1991]. Seeds contain fixed oil called as Moodsga oil. In Ayurveda seeds are used to cure skin diseases, tumours abdominal troubles; orally given seed for scorpion-sting and seeds useful in piles, eye diseases, inflammation in Unani medicine [Mhasker ***et al.,*** **2000].**

The flowers used as an astringent, diuretic, depurative, aphrodisiac and tonic; In Unani medicine the flowers are used to relieve biliousness, inflammation and gonorrhoea and in Ayurveda flowers used to treat leprosy, gout, skin diseases, and their juice for eye diseases [Mhasker ***et al.,*** **2000].** Among tribal population in Madhya Pradesh, externally applied flower paste over chest to treat asthma and aqueous juice of flower drink given for the treatment of sunstroke. A decoction of the petals is given to treat diarrhoea and to puerperal women [Dey, 1980]. Flowers decoction applied as poultice they reduce inflammation and facilitate diuresis and menstrual flow. Orally given aqueous extract of flower used to difficult micturition [Nadkarni and Nadkarni, 1976].

Mizaj (Temperament): Hot $2^0$and Dry2^0

Musleh (Corrective): Pudina

Badal (Proximal substitute): No proximal substitute is identified

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 7 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 0.5 percent, Appendix 2.2.4.
Alcohol soluble extractive	: Not less than 9percent, Appendix 2.2.6.
Water soluble extract	: Not less than 25percent, Appendix 2.2.7.

TLC: TLC of alcoholic extract of the drug on silica gel "G plate" using Toluene: Ethyl acetate (9:1) shows under UV (366 nm) three fluorescent zones at Rf 0.41, 0.49 to 0.65 (elongated and light blue) and 0.91 (blue). On the exposure to iodine vapour six spots appear at Rf 0.04, 0.19, 0.28, 0.41, 0.49 to 0.65 (elongated) and 0.91(all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate for 10 minutes at 110^0C shows six spots at Rf. 0.04 0.19, 0.28, 0.41 elongated spot (0.49-0.65) and 0.91 (all violet). On spraying with Dragendroff reagent followed by 5 % Methanolic : Sulphuric Acid reagent three spots appear at Rf. 0.41, 0.49 to 0.69 (elongated) and 0.91 (all light orange). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Mohallil (Anti-inflammatory); Musakkin (Sedative); Mudire Baul (Diuretic) and Qatil-e Deedan Ama (Vermicidal)

Muhall-e- Istamalat (Therapeutic uses): Wajaul Masana (Cystalgia); Warme Masana (Cystitis); Usr –ul Baul (Dysuria) and Deedan e Ama (Intestinal Worms).

Meqdar-e-Khorak (Dose):3-9 gm.

Side effects/ adverse effects: Excess use may cause constipation.

Important formulations: Habbe Deedan and Sufoof Sailanur Rehem.

PANWAR

(Seed)

It is a dried seed of Panwar plant (Cassia tora Linn; Family: Leguminosae).Cassia tora Linn (Family: Leguminosae) is annual under shrub grows all over the tropical countries (throughout India, Pakistan, Bangladesh and west China) and grows well in wasteland as a rainy season weed. It grows in low lying coastal area, river banks, abundant in waste places and other moist places like uncultivated fields. It is an annual foetid herb, 30-90 cm high. Leaves are green in colour, pinnate, up to 6-8cm long, leaflets are in 3 pairs, distinctly petioled, opposite, conical at one end, ovate, oblong and base oblique. Flowers are pale yellow in color usually in nearly sessile pairs in the axils of the leaves with five petals, upper one are very crowded. Pods are subteret or 4 angled, very slende, 6-12inch long, incompletely septate, membranous with numerous brown oblong, rhombohedral seeds.

Other names:

a) Botanical name: *Cassia Tora* Linn

b) Family: leguminosae

c) Bengali name: Panewar, Chakunda, Chakramard,

d) English name: Ringworm Plant, Sickle Senna, Fetid Cassia

Description:

a) General: The drug Panwar consists of dried seeds of *Cassia Tora* Linn. Syn. Cassia obtusifolia Linn. (Caesalpiniaceae). An annual herb found throughout Bangladesh as a common weed along roadsides or in open waste places. The plant occurs during rainy season. Flowering and fruiting take place during August-November.

b)Macroscopic:Dried seeds are small truncate at both ends, compressed, oval or rhomboidal in shape, 3.0 - 5.6 mm long, 1.5 - 3.5mm broad and 1.2 - 2.8mm thick. Greenish brown or brownish black in colour. The faces are marked by an almost circular zone. The testa is hard, smooth and shining.

c) Microscopic: Transverse section of the seed shows the epidermis of testa composed of longitudinally elongated cells. Hypodermis characterized by the single layered, thick walled cells with broad lumen. Beneath and hypodermal region there is parenchymatouts layer composed of oval to polygonal, elliptical or rectangular cells, 6-8 cells in thickness, enclosing irregular inter cellular spaces. Certain cells are found to possess rosette crystals of calcium oxalate. The endosperm region is mainly characterized by several layers of rectangular, polygonal to oval thick-walled parenchymatous cells.

In transverse section of the cotyledon the epidermis consists of rectangular to oval cells. Palisade attached to epidermis are longitudinally elongated, thin walled, compact two Cells in thickness, few cells contain aleurone grains.

Powder: The powdered drug is yellow in colour, bitter in taste with pungent and agreeable odour. Powder analysis of crude drug reveals the presence of cells of epidermis, hypodermis, parenchyma and crystals of calcium oxalate. Occasionally, epidermal cells, palisade and parenchymatous cells are seen, aleurone grains and endosperm cells abundant.

Parts used: Leaves, seed, Bark and root

Habitat:

Grows all over the tropical countries (throughout India, Pakistan, Bangladesh and west China) and grows well in wasteland as a rainy season weed. It grows in low lying coastal area, river banks, abundant in waste places and other moist places like uncultivated fields.

Phytoconstituents:

Gylcosides, proteins, reducing sugars, steroids, tannins, fixed oils, sodium, potassium and iron. Palmitic, steric and linoleic acid deducted in seed oil.A new α-pyrone-toralactone isolated from seeds; rubrofusar in -6-β-gentioioside and new anthroqukinone glycoside-8-hydroxy-3-methyl anthraquinone-1-B-gendtiobioside alongwith chrysophanol, physcion, emodin and rubrofusanin isolated from seeds. Chrysophanic acid-9-anthrone also isolated from seeds.

Several compounds belonging to anthraquinone and naphthopyrone groups have been isolated fromseeds of this plant. Three crystalline substances havebeen isolated from seeds of C. tora known as tora substance A, B and C. From properties of thesesubstances and some typical derivatives, it appeared that tora substance C might be identical with

rubrofusarin a metabolic product of the fungus, Fusarium culmorum and tora substance B with nor-rubrofusarin the demethylation product of rubrofusarin. The seeds of C. tora yielded sitosterol from petroleum ether extract, chrysophanol, physion emodin and rubrofusarine from chloroform extract and two glycosides, rubrofusarin -6- β -gentiobioside and 8Hydroxy-3-methyl anthraquinone -1- β -gentiobioside have been found in ethanolic extract. Three naphthopyrone glucoside, cassiaside, rubrofusarin -6-O- β-D-gentiobioside and toralactone -9-O- β-D- -gentiobioside isolated from butanol soluble extract of seed .

It also contains phenolic glycosides namelyrubrofusarine triglucoside, nor-rubrofusarin gentiobioside, demethylflavasperone gentiobioside, torochrysone gentiobioside, torachrysone tetra- glucoside and torachrysone apioglucoside. Seed oil contains different percentage of oleic, linoleic, palmitic, stearic and lignoceric acids. The C. tora seed is composed of hull (27%), endosperm (32%) and germ (41%).

Gum obtained from the seeds of C. tora is known as 'Panwar gum'. Chemically it is neutralheteropolysaccharide of galactose and mannose (i.e. galactomannans). pH of the Panwar gum mucilage is approximately 7. Seeds ofC.tora contain about 23.2% of proteins, rich in all essential amino-acids, particularly, methionine and tryptophan. Other parts: Pods are richin sennosides.

Af'aal-e-Adviya (Pharmacological Activities):

Several research workers have reported different biological activities of c. tora in various in vitro and in vivo test models. These have been described in detailed infollowing headings:

Antioxidant Activity: The methanolicextract of seeds of C. tora (MECT) shows stronger antioxidant activity. It was found that MECT exhibits stronger antioxidant activity as compared to Alpha-tocopherol. Emodin was demonstrated as antioxidant component of MECT. The phenolic active component, alaternin and nor-rubrofusarin glucoside isolated from extract of C. tora also showed a potent free radical scavenging activity.

Hypolipidemic Activity: Ethanolic extract and its ether soluble and water soluble fractions were evaluated for their hypolipidemic activity against triton induced hyperlipidemic profile. Decreased serum and triglyceride level of total LDL cholesterol but increased HDL cholesterol level by different percentages was observed. Soluble fibers isolated from the seeds showed the hypolipidemic level due to their phenomenal rheological behavior and lipid metabolism. The soluble fibers enhances fecal lipid excretion and showed significant

hypolipidemic effect due to marked reduction in serum concentration of total cholesterol and triglyceride level **Hepatoprotective Activity:** The different extracts of seeds of Cassia tora have been studied for cytoprotection against galactosamine toxicity in primary cultured hepatocytes. Methanolic extract of seeds showed a significant hepatoprotective effect against toxicity of galactosamine in primary cultured rat hepatocytes. Methanolic extract at a dose of 400mg/ml orally exhibited significant protective effect by lowering the serum level of transaminases in rats. The % Cytoprotection of different isolates obtained from the methanol extract of seeds of C. Tora werealso studied against galactosamine toxicityin primarycultured hepatocytes. The naphtha-pyrone glycosides were found to have significant hepatoprotective effect against galactosamine damage. It has also been reported that Ononitol monohydrate isolated from the leaves possesses significant hepatoprotective activity as compared to reference drug sylimarin. Ononitol monohydrate decreases the level of serumtransaminase thereby shows its hepatoprotective activity.

Antibacterial Effect: The effect of phenolics glycoside, their aglycones and several other compoundsstructurally related to them on E.coli K12, Pseudomonas aeruginosa PA 01 and some strains of Staphylococcus aureus were examined. Among them, torochrysone, torolactone, aloe-emodine, rhein and emodine showed noticeableantibacterial effect on four strains of methicillinresistant Staphylococcus aureus with minimum inhibitory concentration of 264µg/ml.

Antimutagenic Activity: The antimutagenic activity of a methanolic extract of roasted C.tora seeds against Aflatoxin-B1 (AFB1) was demonstrated with Salmonella typhimurium assay. The number of relevant per plate decreased significantly when the extract was added to assay system using Salmonella typhimurium TA100 and or TA98.Alaternin and isorubrafusarin gentiobioside found to possess antimutagenic activity.

Antifungal Activity: The leaf extract has shown the significant antifungal activity to inhibit the growth of Candida albicans, Aspergillus niger, Sachharomyces cerevisiae and Trichophyton mentagrophyte. It shows antifungal activity due to chrysophenol and crysophanic acid- 9- anthrone and other anthraquinones such as emodine, physcion and rhein.

Oxytocic Activity: The seeds of *C. tora* contain oxytocic principle. It was found to be effective in producing the contraction of isolated uterus of guinea pig. The claim for oxytocic principle from the seeds lacks credibility due to insufficient experimental data.

Antihelmintic Activity: Alcohol and aqueous extracts of *C.tora* seeds showed antihelmintic activity against Pheretima posthuma and Ascardia galli due to the presence of flavonoids. Both the extract exhibitedantihelmintic activity at highest concentration of 100mg/ml.

Purgative Activity: The purgative action of crude methanolic extract & isolatedaloin emodin from separated from *C. tora* has reported.

Mizaj (Temperament): Hot 2° Dry 2°

Musleeh (Corrective): Not require.

Badal (Proximal substitute): No proximal substitute is identified.

Identity, purity and strength:

Foreign Matter	- Not more than 2%,Appendix 2.2.2.
Total Ash	- Not more than 6%, Appendix 2.2.3.
Acid insoluble ash	- Not more than 0.2%, Appendix 2.2.4.
Alcohol-soluble extractives	- Not less than 5% , Appendix 2.2.6.
Water-soluble extractives	- Not less than 12%, Appendix 2.2.7.

TLC behaviour of petroleum ether (60-80^0) extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Chloroform: Benzene (50:10)	0- Phosphoric acid	6	0.19, 0.26,0.45, 0.55, 0.69, 0.85

Aa'maal-e-Adviya (Pharmacological Action):

Mushil-e-Balgham, Mushil-e-Sauda, Jali, Qatel-e-Dedan.

Mahall-e-Istemalat (Therapeutic use):

Fasad-ud-Dam, Juzam, Bars, Quba, Bawaseer, Dedan-e-Amya.

Meqdar-e-Khorak (Dose): 1.7-3.6 g

Side-effects / Adverse-effects:

Use it with care in people who have diarrhoea and hypotension.In addition, because of its purging nature, women during pregnancy should stay away from it. The latest study found that long-term consumption of this herb might lead to irregular menstruation, or even abnormal endometrium that could induce premature labor.

Important formulations: Su foof-e-Bars

QIRFA

(Stem bark)

The drug Qirfa (Darchini) is a dried stem bark of cinnamon (*Cinnamomum zeylanicum*); an evergreen tree. It is belongs to family lauraceae. Historically it is used as drug as well as spice and condiment in our and nehoburing countries. Recently several phytochemicals were identified and obtained from drug Qirfa. With these phytochemical constituents several therapeutic activities were scientifically proved by different experimental studies. Besides these, Qirfa is a very famous and has been used therapeutically. In Unani medicine detail Description of Qirfa is mention in classical literature. Unani physicians were aware about the therapeutic efficacy of Qirfa since ancient time. In order to obtain desirable or increase therapeutic efficacy several dosage forms were developed and designed by Unani physicians like Roghan, Tila, Majoon, Jwarish, Khameera, Hab etc. In these dosage forms Qirfa used as main ingredient or supportive ingredient.

Other names:

a) Botanical name: *Cinnamomum zeylanicum* Blume

b) Family: Lauraceae

c) Bengali name: Dalchini, Daruchini.

d) English name: Cassia, Chinese Cinnamon, Cinnamon Bark, Chinese cassia, Cinnamon, Cylon Cinnamon.

Description:

a) General: Cinnamon is an evergreen tree which grows from 20 to 30 feet. The plant has strong branches and thick scabrous bark which is smooth and yellowish. In colour, the leaves are dark green on top and lighter green underneath. It has small yellowish-white flowers with a disagreeable odour that bears dark purple berries. The fruits are oval and berry like.



b) Macroscopic:Pieces of bark vary from 5 to 40 cm in length, average 1 lo 2 cm in widthand 3 to 5 mm thickness, channeled: or single quill of dark, earthy brown colour and smooth, but greyish cork persists; inner surface lighter brown: fracture is short, granular in outer part and fibrous in inner part; odour and taste resemble cinnamon, but less delicate and more mucilaginous and astringent in taste. Outer surface dull yellowish-brown, while the inner surface is dark yellowish-brown in color, the fragrance is pleasant, perfumed and sweet followed by deep sensation. It has the splintery fracture. The external surface of the bark is clear by wavy longitudinal markings with small holes of scratches left by the divisions. The internal surface also shows the longitudinal markings. The bark is free of cork tissue (Khandelwal et al., 2008).

c) Microscopic: Transverse section shows lenticels: periderm consists of few layers of polygonal-tubular cork cells arranged in alternating layers of thick-walled and thin-walled cells with red-brown contents, thick walled cork cells lignitled: phellogen and phelloderm are not separable; cortex 12 to 15 layered, parenchymatous with abundant simple starch grains upto 20µ; scattered stone cells with more lignified and pitted tangential and lateral walls;

pericycle fibers of 25µ.L to 40 µ in width, in tangential rows embedded among stone cell groups; sclerenchymatous, lignified, pitted, inner and radial wall thick, striation usually visible: secondary phloem parenchymatous with starch grains and acicular crystals; oil cells, thin, large, oval, associated with thin walled parenchyma and medullary rays; medullary rays narrow on inner side and wider towards periphery, pits absent from wall: containing starch grains and small acicular crystals of calcium oxalate: phloem in isolated groups along with isolated or short tangential rows of thick fibers, less than 30µin width and 300µ to 700µ in length; lignified and striated with narrow lumen; mucilage cells scattered in ground parenchyma.

Powdcr: Powder yellowish in colour, oily in nature with typical sweet smell of orange, Under microscope fragments of epidermis, parenchymatous tissue having some part of oil gland and traces of vascular bundles are seen; oil droplets, starch grains, solid yellowish green bodies, calcium oxalate and hesperidine crystals are seen scattered.

Parts used: leaves, bark, fruits, root bark, flowers and buds.

Habitat: Cinnamon is found widely in Sri Lanka but grows in Bangladesh and neighboringcountries
too.

Phytoconstituents:
Cinnamaldehyde. cyclic glycerol 1-3 acetal and its cis isomer, syringaresinol; cinnazeylanine, cinnzeylanol, cinncassiol A & its glycoside, anhydrocinnzeylanine, anhydrocinnzeylanol. Trans-cinnamic acid, coumarin, diterpenoids-cinncassiols A, B& C, Cinncassiol Cl, β - sitosterol, protocateachuic acid. Barkoilcontents-Cinnamaldehyde, cugenol, cinnamic acid, cinnamyl acetate, salicyaldehyde, 0-methyl-coumaraldehyde, benzaldehyde, methyl salicylate,cuminaldehyde, α-pinene, l-8cineol,A-Terpineol, guiacol.
Cinnamon bark contains up to 4% of essential oil consisting primarily of cinnamaldehyde (60-75%), cinnamyl acetate (1-5%), eugenol (1-10%), β-caryophyllene (1-4%), Linalool (1-3%) and 1.8-cineole (1-2%) and pinene, verbenone, pinene oxide, verbenol and verbenyl hydroperoxide.

Af'aal-e-Adviya (Pharmacological Activities):

Some of Af'aal-e-Adviya (Pharmacological Activities) are described here.

Anti-inflammatory activity: Cinnamon bark extract (CBE) in carrageenan-induced albino rats model with a dose of 400mg/kg showed a significant decrease in the volume of inflammation (Maridass et al., 2008). Proinflammatory cytokine TNF-α using flow cytometry by CZ ethanolic extract showed suppression of intracellular release of TNF-α in murine neutrophils as well as leukocytes in pleural fluid. The extract was found to inhibit TNF-α gene expression in LPS stimulated human PBMCs at 20 μg/ml concentration. A potent anti-inflammatory activity of cinnamon extract is suggestive of its anti-arthritic activity (Joshi et al., 2010). CZBE in the rat's in vitro, carrageenan-induced rat paw edema (CPE) and adjuvant-induced arthritis showed a significant anti-inflammatory effect at the dose of 4, 8 and 25 mg/kg, p.o. The dose of 8 mg/kg, p.o. was selected for the evaluation of anti-arthritic activity in the model and showed disease-modifying potential in animal models of inflammation and arthritis in rats (Vetal et al., 2013). Ameliorative effects of the bark of CZ polyphenolic (CPP) fraction in animal models of inflammation and arthritis at a dose of 200 mg/kg, p.o. for 10 days showed a significant decrease in elevated serum TNF-α concentration without causing gastric ulcerogenicity in the AIA model in rats.

Anticancer activity: Cinnamon essential oil showed anticancer potential against head and neck squamous cell carcinoma (HNSCC) via decreasing epidermal growth factor receptor-tyrosine kinase. The mechanism underlying its anticancer action was attributed to the suppression of EGFR-TK. It also significantly suppressed the tumor regression in the Hep2 xenograft model (Yang et al., 2015). CZ bark extracts (CZBE) against the antimicrobial and anticancer activity, in vitro by MTT assay on Hep G2 cell line in the presence of methanolic CZBE showed an IC50 value of 150μg/ ml. This study proved that CZB is a reliable and safer herbal drug that can be used in pharmaceutical preparations for infectious and malignant diseases (Varalakshmi et al., 2014). 2-Hydroxycinnamaldehyde from CZ showed antitumor activity against oral cancer in vitro and in vivo in a rat tumor model. Cell histological analysis showed that it decreased tumor cell proliferation and induced apoptosis in a rat tumor model (Kim et al., 2010).

Antihypertensive activity: Aqueous extract of stem bark of CZ showed antihypertensive and vasorelaxant effects in rats by decreasing in mean arterial blood pressure in anesthetized normotensive Wistar rats, salt-loaded hypertensive, L-nitrogenine amino methyl ester hypertensive and spontaneously hypertensive rats. Pretreatment of rats with either propranolol or atropine significantly inhibited the hypotensive effects of the plant extracts. Also, pre-treatment of rats with Lnitrogenine amino methyl ester inhibited the sustained plant

antihypertensive effects, suggesting a possible active vasodilatation. The vasorelaxation effects may be involved in the antihypertensive mechanism, partially by increasing the endothelial nitric oxide and by activating the potassium adenosine triphosphate channels in vascular smooth muscle (Nyadjeu et al., 2011).

Alzheimer's disease: Cognitive effects of aqueous bark extract of CZ on the monosodium glutamate-induced non-transgenic rat model have been studied. The results were showed that improved the insulin sensitivity, increased phosphorylated glycogen synthase kinase-3β (pGSK3β), inhibited the cholinesterase activity, and improved the learning ability (Madhavadas et al., 2017). Cinnamomum extract on the amyloid formation of hen egg-white lysozyme and study of its possible role in Alzheimer's disease. The result showed that it has no any effect on protein stabilization and thus directly interact with amyloid structure and inhibit the formation of these structures (Ramshini et al., 2015). Anticholinesterase inhibitory activity of crude methanol extract of CZ leaves and cinnamon oil was evaluated by 96 well microtiter plate assay and thin layer chromatography bioassay detection methods showed that cinnamon oil has better anticholinesterase activity than its methanol extract in the symptomatic treatment of Alzheimer's disease (Dalai et al., 2014).

Wound healing activity: CZ bark extracts significantly enhanced the wound breaking strength in the case of incision wound, the rate of wound contraction and the period of epithelization in the case of excision wound. The granulation tissue weight, its breaking strength, and its hydroxyproline content was also increased by the extract in the dead space wound (Kamath et al., 2003).

Immunomodulator activity: Cinnamon extract in collagen-induced arthritic mice showed good ameliorative effects after the second day of treatment. A greater therapeutic role was observed for the 4 mg/kg/oral of body weight dosage of the methanolic extract. Swelling of the spleen was greatly reduced along with the generation of free radicals by lymphocytes, post-treatment (Qadir et al., 2018).

Antimicrobial activity: The essential oil of CZ showed strong antimicrobial activity against all microorganisms tested and indicating the possibilities of its potential use in the formula of natural remedies for the topical treatment of infections and neoplasms (Unlu et al., 2010). Cinnamon oil and olive extract against Salmonella typhimurium DT104 in ground pork and the influence of heat and storage on the antimicrobial activity. It showed the effectiveness of these antimicrobials against multidrug-resistant S. typhimurium in ground pork and their stability during heating and cold storage (Chen et al., 2013).

Anti-fungal activity: CZ essential oil showed strong anti-fusarium activity and in vitro interaction between trans-cinnamaldehyde and natamycin, was also investigated; an enhanced fungal growth inhibition was observed. It showed that CZ essential oil/trans-cinnamaldehyde provides a promising basis to develop a novel strategy for the treatment of F. keratitis (Homa et al., 2015). Essential oils of CZ and Syzygium aromaticum (SA) against crown rot and anthracnose pathogens investigated. Cinnamon leaf, bark, and clove oils were tested as fungistatic and fungicidal against the test pathogens within a range of 0.03-0.11% (v⁄v) (Ranasinghe et al., 2002). CZ showed in vitro activity against fluconazole-resistant and susceptible Candida isolates. The MICs of the bark of CZ were slightly better than commercially available cinnamon powder (Quale et al., 1996).

Analgesic activity: Analgesic activity of cinnamaldehyde and its interaction with diclofenac sodium and pentazocine in albino mice have been studied. Peripheral analgesic activity was evaluated by acetic acid induced writhing test and central analgesic activity was studied using Eddy's hot plate method. The findings suggest that the cinnamaldehyde significantly increases the analgesic activity of diclofenac sodium but decreases the analgesic activity of pentazocine at different doses (Churihar et al., 2016).

Anti-secretagogue and anti-ulcer effects: Anti-secretagogue and antiulcer effects of aqueous suspension of CZ in rats at doses 250 and 500 mg/kg/oral have been screened using pylorus ligation (Shay) rat model, necrotizing agents and indomethacininduced ulceration in rats. The gastroprotection of cinnamon observed in the study was attributed to its effect through inhibition of basal gastric secretion (attenuation of aggressive factors) and stimulation of mucus secretion (potentiating of defensive factors); and increase in nonprotein-sulfhydryl concentration probably due to prostaglandin inducing abilities mediated through its antioxidant property (Alqasoumi et al., 2012).

Anti-asthmatic activity: Cinnamon bark showed anti-asthmatic effects in hyperresponsiveness laboratory animals. It exhibited the significant decrease in breathing rate and peak inspiratory flow whereas the peak expiratory flow and forced vital capacity expired in one second was significantly increased as compared to airway hyperresponsiveness control rats (Kandhare et al., 2013). **Hepatoprotective activity:** Studied a hepatoprotective activity of cinnamon ethanolic extract against CCI4-induced liver injury in rats,administration with cinnamon extracts (0.01, 0.05 and 0.1 g/kg) for 28 days significantly reduced the impact of CCl4 toxicity on the serum markers of liver damage, aspartate aminotransferase, alanine aminotransferase and alkaline phosphatase. In addition, treatment of cinnamon extract resulted in markedly increased the levels of superoxide dismutase and catalase enzymes in

rats suggested that cinnamon extract acts as a potent hepatoprotective agent against CCl4 induced hepatotoxicity in rats (Eidi et al., 2012).

Memory enhancing: activity Standardized lyophilized CZ bark extract showed attenuating effect against streptozotocin-induced experimental dementia of Alzheimer's type. In the Morris water maze test, it significantly decreased the transfer latency and increased the time spent by the animals in target quadrant. Similarly, in the object recognition test, the extract-treated animals exhibited an improved discrimination between a familiar object and a novel object, indicating the reversal of STZinduced memory impairment. It also restored STZinduced alteration in AChE activity and oxidative stress parameters in both brain parts (Malik et al., 2015).

Anti-hyperlipidemic:activity Alcoholic cinnamon extract on cholesterol-induced hyperlipidemic and alloxan induced diabetic rats and estimation of hematological, biochemical and immunological parameters exhibited that extract is effective in controlling blood glucose level, serum lipids among hyperlipidemic and diabetic rats (Mhammad et al., 2015).

Mizaj (Temperament): Hot 2° and Dry 2°

Musleeh (Corrective): Not require.

Badal (Proximal substitute): No proximal substitute is identified.

Identity, purity and strength:

Foreign Matter	-	Not more than 2%,	Appendix 2.2.2.
Total Ash	-	Not more than 7%,	Appendix 2.2.3.
Acid insoluble ash	-	Not more than 1%,	Appendix 2.2.4.
Alcohol-soluble extractives	-	Not less than 4%,	Appendix 2.2.6.
Water-soluble extractives	-	Not less than 7%,	Appendix 2.2.7

TLC behaviour of ethanolic extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Petroleum ether: Acetone	On spraying plate with 10% Methonolic H2S04	8	0.05, 0.15, 0.21, 0.25,

: Methonol (75:25:3)	and heated for 5 minutes at 105o		0.36, 0.45, 0.65, 0.78

Aa'maal-e-Adviya (Pharmacological Action):

Mulattif, Mohallil-e-waram, Muqawwi-e-Aza-e-Raisa, Mudirr-e-Baul, Daf-e-NazIa, Dafe Zukam, Muqawwi Quwwat-e-. Mudafeyat-wa-Asab, Muqawwi-e-Bah, Muqawwi-e-Basar, Dafe Khafqan

Hazim, Kasir-e-Riyah, Munaffis-e-Balgham, Muqawwi-e-Dandan , Muqawwi-e-Meda, Muqawwi-e-aza-e-raesa, Muqawwi-e-dil wa dimagh, Muqawwi-e-Kabid, Muqawwi-e-Asab, Muqawwi-e-Bah Mufarreh,Mufatteh, Moharrik-e-Bah, Mohallil, Mudirr-e-Baul, Mudirr-e-Haiz, Mujaffif, Musakkin-e-Alam, Musakkhin, Musakkin, Muskit-e-Janeen, Daf-e-Taffun, Dafe Tap,Muharrik, Mulayyan, Mulattif, Munzij, Musaffi, Qabiz, Tiryaq-e-Samoom, Jazib, Jali, Mukhaddir, Katil-e-Jarasim, Daf-e- Ishal, Daf-e-Ziabetus, Daf-e-Qai, Daf-e-Tashannuj, Daf-e-Ufoonat,Mundamil-e-Kurooh, Moarriq, Muqawwi-e-Raham,

Mahall-e-Istemalat (Therapeutic use):

Ehtibas-e-Tams, Sual, Warm-e- Reham, Ehtebas-e-Baul, Nazla Zukam, Zof-e-Zaker, Ziqqun Nafs, Zof-e-Demag, Zof-e-Asab, Wajaul Mafasil, and Kharish.

Meqdar-e-Khorak (Dose): 3-5 g

Side-effects / Adverse-effects:

Darchini is contraindicated in stomach and duodenal ulcers and inpregnancy because it causes Isqat.

Important formulations: Rough an-e-Surkh, Arq-e-Chob Chini, Arq-e-Hazim, Arq Ma'ullaham Khaas, Laboob-e-Kabir,Dawa-ul-Misk Motadil Jawahar Wali, Dawa-ul-Misk Motadil Sada,Habb-e-Afyun,Habb-e-Chobchini, Habb-e-Irqun Nisa, Habb-e-Munaish, Habb-e-Nazla, Habb-e-Shahm-e-Hanzal, Halwa-e-Mugawwi-e-Basar, Halwa-e-Salab, Halwa-e-chobchini, Itrifal Muqawwi-e-Dimagh, Itrifal-e-Muqawwi-e-Basar, Laboob Kabeer Khaas, Halwa Gheekwar, Jawarish Bisbasha, Jawarish Darchini, Jawarish-e-Darchini Qawi, Jawarish Kundur, Jawarish Jalinoos, Jawarish-e-Kamooni Kabir, Jawarish-e-Muqawwi-e-Meda, Jawarish Ood Shirin, Jawarish-e-Podina, Jawarish Safar Jali Mushil, Jawarish Shaharyaran,

Jawarish Zarooni Sada, Jawarish Zarooni Sada, Labub-e-Muqawwi-e-Bah, Laooq-e-Zeekunnafs Balghami, Majun Arad Khurma, Majoon Boolis, Majun Azaraqi, Majun Barhami, Majun Dabid-ul-Ward, Majoon Ispand Sokhtani, Majun Jalinus Luluvi, Majoon Rahul Momineen, Majoon Ushba, Majoon Ushba, Majoon Rahat, Majun Pumba, Mufarreh Yaqooti Motadil, Nawed-e-Nau, Namak Sulemani, Qurs Pudina, Roghan-e-Darchini, Safoof Darchini wala, Sharbat Nankhwah, Sharbat Salajeet, Tila-e-Darchini wala, Tila Nishat Angez,

RAAL

(RESINOUS EXUDATE)

This tree is native to the Indian subcontinent, ranging south of the Himalaya, from Myanmar in the east to Nepal, India and Bangladesh. In India, it extends From Assam, Bengal, Odisha and Jharkhand west to the Shivalik Hills in Haryana, east of the Yamuna. The sal tree is known also as sakhua in northern India, including Madhya Pradesh, Odisha and Jharkhand. It is the state tree of two Indian states - Chhattisgarh and Jharkhand. *Shorea robusta* has been traditionally used for various ailments. The leaves and bark are used to treat wounds, ulcers, leprosy, cough, gonorrhea, earache and headache. The bark is also used to treat diarrhoea, dysentery and vaginal discharges.

Other names:

a. Botanical Name: *Shorea robusta*

b. Family: Dipterocarpaceae

c. Bengali Name: Shakgaccha/Sandras

d. English Name: White Damar Tree

Description

a. General:The drug Raal consists of resinous exudate of *Shorea robusta* belongs to family-Diterocarpaceae, a large evergreen tree, up to 30 m high with a cylindrical bole, indigenous to the evergreen forests of the Western Ghats of North Kanara to Kerala and also extensively planted as an avenue tree in Karnataka;resinous exudate is obtained by making semicircular incisions on the stem through the cork ambium up to the surface of sapwood.

Fig: No 27: S*horea robusta*plant and racinous exudate

b. Macroscopic**:**Rough, irregular, solid, brittle masses, braking into angular pieces, up to 1.5 cm thick light yellow to pale yellow in color; odor fragment-tasteless.

c. Microscopic**:**Slightly soluble in alcohol in which it forms a jelly like mass, insoluble in petroleum ether (40 -60^{0}C), forming white precipitate; insoluble in carbon-disulphide but yields jelly –like mass, dissolves entirely and gives a dense red color with concentrated sulphuric acid; dissolves mostly in chloroform giving white or milky solution; (Sal resin dissolves almost entirely in petroleum ether forming a pale cream solution and also dissolves entirely in carbon-disulphide.)

Parts used: Resinous exudate

Habitat: Nepal, India and Bangladesh

Chemical Constituents: Resin

Afa'al-e-Adviya (Pharmacological activities): The methanolic extract of S.robusta leaves with two different dose levels exhibited a significant anti-nociceptive activity in different animal models of pain. In hot plate test, nociceptive reaction towards thermal stimuli in mice is a well validated model for detection of opiate like analgesic drugs where in pain response is from spinal origin. Acetic acid – induced writhing has been used as a model of chemonociceptive induced pain, which peripherally increase PG-E2 and PG-F2. In both hot plate and acetic acid induced nociceptive models S.robusta leaves extract exhibited antinociceptive activity which indicates both central and peripherally mediated anti-nociceptive properties. The formalin induced pain test can be used to clarify the possible

mechanism of antinociceptive effect of a proposed analgesic. Centrally acting drugs such as opioids inhibit both phases equally whereas peripherally acting drugs inhibit only the late phase. In formalin – induced pain experiment, the extracts at the test doses were found to inhibit the inflammatory pain better than the neurogenic induced pain. The maximal effect of S.robusta leaves shows in the late phase suggests that their activity may be resulting from their peripheral action, when compared with standard. The central analgesic property of the extracts was corroborated by the first phase of formalin- induced pain, hot plate, tail- clip and tail- flick results. Carrageenan-induced paw edema is the standard experimental model of acute inflammation and carrageenan is the phlogistic agent of choice for testing anti inflammatory drugs as it is not known to be antigenic and devoid of apparent systemic effects. Moreover, the experimental model exhibits a high degree of reproducibility. Carragenan-induced edema is a biphasic response, the first phase is mediated through the release of histamine, serotonin and kinins where as the second phase is related to the release of prostaglandins and mediated by bradykinin, leucotrienes, polymorphonuclear cells and prostaglandins produced by tissue macrophages.The antiinflammatory activity shown by the fruit extract of S.robusta(200 and 400mg/kg) in carrageenan –induced paw inflammation over a period of 4h was quite similar to that exhibited by the group treated with standard diclofenac sodium.These results indicate that the extract acts on both initial and later phases of inflammation. Later phase activity might probably involve with arachidonic acid metabolites which produce an edematous response by mobilization of the neutrophils. Based on the results obtained it can be concluded that the methanolic extract of fruits of S.robusta posses potential anti-nociceptive and anti inflammatory activities. Based on the investigations results, it can be concluded that and S.robusta was endowed with peripheral and centrally acting analgesic properties as well as anti-inflammatory activity on acute inflammatory process..

Mizaj (Temperament): Hot 3^0 and Dry 3^0

Musleh (Corrective): Ghee/oil.

Badal (Proximal substitute): Sohaga Biriyana and luban.

Identity, purity and strength:

Foreign Matter : Not more than 2 percent, Appendix 2.2.2.

Total Ash	: Not more than 0.1 percent,	Appendix 2.2.3.
Acid-insoluble ash	: Negligible;	Appendix 2.2.4
Alcohol soluble extractives	: Not less than 60percent,	Appendix 2.2.6.

TLC: TLC of alcoholic extract on silica gel "G plate" using Benzene:Methanol (95:5) shows under UV (366 nm) three fluorescent spots at Rf 0.04, 0.28 and 0.93 (all blue). On the exposure to iodine vapour seven spots appear at Rf 0.04, 0.28, 0.48, 0.65,0.76, 0.85 and 0.93(all yellow). On spraying with Anisaldehyde-Sulphuric acid reagent and heating the plate for 10 minutes at 110^0C shows sevenspots at Rf 0.04, 0.28, 0.48, 0.65,0.76, 0.85 and 0.93(all yellow)

Aa'a mal-e-Adviya (Pharmacological Action): Qabiz (Constipative); Dafe-Taffun (Antiseptic); Mohallile Waram (Anti-inflammatory); Munaffise Balgham (Expectorant) and Mudammil (Cicatrizant).

Muhall-e- Istamalat (Therapeutic uses): Sual –e Muzmin (Chronic Bronchitis); Ishal (Diarrhoea); Zaheer (Dysentry); Damameel (Boils); Jiryane Mani (Spermatorrhoea); Sil (Pthisis); Diq (Tuberculosis); Wajaul Mafasil (Joint Pain).

Meqdar-e-Khorak (Dose):1-3 gm

Side effects/ adverse effects: It may be harmful for hot temperamental person.

Important formulations: Habbe- Raal; Marhame Raal; Marhame Basaliqoon; Marhame Gulabi.

REESH-E-BARGAD

(Aerial root)

Ficus benghalensis, commonly known as the banyan, banyan fig and Indian banyan, is a tree native to the Indian Subcontinent. Specimens in India are among the largest trees in the world by canopy coverage.

Other names:

a. Botanical Name: *Ficus bangalensis* Linn

b. Family: Moraceae

c. Bengali Name: Bar, Bot

d. English Name: Banyan Tree

Description

a. General:The drug Reesh-e-Bargad consists of dried aerial roots of *Ficus bengalensis* Linn belongs to family-Moraceae, a very large tree with spreading braches. It occurs throughout the country, and also planted on road sides and in gardens.

Fig: No: 28: Banayan tree (Aerial root)

b. Macroscopic**:**Drug occurs in cut pieces, 4 to 8 cm long, 0.1 to 1.2 cm thick; cylindrical , unbranched or branched; rough due to longitudinal and transverse cracks and transverse rows of the lenticels ; external surface grey, cut surface reddish-brown; fracture fibrous in bark portion and tough and short in wood portion.

c. Microscopic:Aerial root shows cork consisting of 4 to 6 or more rows of narrow, tangentially elongated cells, secondary cortex consisting of a zone of 4 to 5 rows of stone cells, followed by wide zone of thin walled parenchymatous cells, filled with reddish brown contents. A numberof large groups of stone cells, oval to elliptical, elongated, thick walled, with wide lumen and clear pit canals found scattered throughout secondary cortex. Secondary phloem a wide zone consisting of sieve tubes, phloem fibers and phloem parenchyma; traversed by phloem rays, phloem fibers numerous arranged in tangential bands alternating with sieve elements.Secondary xylem very wide consisting of pitted xylem vessels, fibers and xylem parenchyma. All elements being lignified; vessels single or in groups; xylem parenchyma numerous, xylem fibers numerous, thick walled with blunt tips and wide lumen, xylem rays numerous, uni to tetra seriate.

d. Powder**:**Reddish-brown shows oval to elliptical, elongated, thick-walled stone cells with wide lumen and clear pit canals; fibers, thick walled with blunt tips and wide lumen; xylem vessels showing pitted thickening.

Parts used: Aerial Root

Habitat: Bangladesh and India

Chemical Constituents: Tripene, Friedelin and a-sitosterol.

Afa'al-e-Adviya (Pharmacological activities):

Anti-oxidant effect:Parameshwari *et al.* (2012) demonstrated that the methanolic extract of *Ficus benghalensis* protects against isoniazid and rifampicin-induced oxidative liver injury in rats as evidenced by significant reduction of isoniazid-rifampicin-induced elevation in the levels of serum diagnostic liver marker enzymes (SGPT, SGOT and ALP) and Thio-Barbituric acid reactive substances (TBARS) level. Moreover, total protein and reduced glutathione levels were significantly ($P<0.001$) increased in treatment group.

Analgesic activity:

The analgesic activity of Stem bark extraction of *Ficus benghalensis* tested using acetic acid induced writhing model on rats, showed significant analgesic activity as demonstrated by Vishnu *et al.,* in 2010.

Anti-inflammatory activity:

In a study conducted by PrathapKumar *et al.* in 2013 to determine the anti-inflammatory effect of methanolic extracts of the leaves of *Ficus benghalensis* which was evaluated in experimental animals indicated that the methanolic extract of *Ficus benghalensis* exhibited significant activity in the treatment of inflammation compared with the standard drug diclofenac, in formalin-induced hind paw edema model in rats as measured using plethysmometrically.

In trinitrobenzenesulfonic acid (TNBS) induced Inflammatory Bowel Disease (IBD) another inflammatory disease model in rats, aqueous extract of *Ficus benghalensis* bark exhibited a significant protective effect on the colonic tissue malondialdehyde (MDA), myeloperoxidase (MPO), superoxide dismutase (SOD), and nitric oxide (NO) levels and percent mast cell protection in mesentery as compared to prednisolone in rats.

Anti-diarrhoeal and Anthelmintic activity:

Mukherjee *et al.* in 1998 reported that the ethanol extract of the hanging roots of *F. benghalensis*, when administered per orally reduced diarrhoea by inhibiting gastrointestinal motility and PGE2-induced entero-pooling against castor oil induced diarrhoea. [20]In addition the methanolic, aqueous, chloroform and petroleum ether extracts of the roots of *Ficus benghalensis* have potent anthelmintic activity when compared with conventionally used drug, as they were found not only to paralyze but also to kill the worms.

Anti-stress, Anti-allergic and Immunomodulatory activity:

Various extracts (aqueous, ethanol and ethyl acetate extracts) of *Ficus benghalensis* bark screened for their anti-allergic and anti-stress potential in asthma model by milk-induced leucocytosis and milk induced eosinophilia, demonstrated significant decrease in leucocytes and eosinophils in the order given while petroleum ether and chloroform extracts

were inactive. This shows the application of polar constituents of *Ficus benghalensis* bark as anti-stress and anti-allergic agents in asthma.

The Immunomodulatory activity of the aerial roots of *Ficus benghalensis* for its effect on both specific and non-specific immunity and successfully proved that the extract exhibited a significant increase in percentage phagocytosis by human neutrophils in the *in vitro* tests. In an *in-vivo* study, the extract was found to exhibit a dose related increase in the hypersensitivity reaction, to the Sheep RBC antigen. It also resulted in a significant increase in the antibody titer value, to Sheep RBC.

Anticancer and anti-bacterial activity:
The fruit extract of *Ficus benghalensis* has been documented for its anti-cancer activity in the potato disc bioassay, but none of the tested extracts showed any marked inhibition on the uptake of calcium in to rat pituitary cell-line GH4C1.The extracts of the four tested *Ficus* species had significant antibacterial activity, but no antifungal activity. The results of this preliminary investigation support the traditional use of these plants in folk medicine for respiratory disorders and certain skin diseases.

Anti-diabetic and Ameliorative effect:
The aqueous extract of *Ficus benghalensis* bark at a dose of 500mg/kg/day exhibited a significant anti-diabetic and ameliorative activity as evidenced by histological studies in normal and *Ficusbenghalensis* treated streptozotocin induced diabetic rats. In addition leucocyanidin derivative isolated from *Ficus benghalensis* was proved to have significant Insulin sparing action.

Mizaj (Temperament): Cold and Dry (2^{nd})

Musleh (Corrective): Katira ghum; Modhu and Sirka.

Badal (Proximal substitute): Apim Bij

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 7percent, Appendix 2.2.3.

Acid-insoluble ash : Not more than 1 percent, Appendix 2.2.4.

Alcohol soluble extractives : Not less than 3 percent, Appendix 2.2.6.

Water soluble extractives : Not less than 4 percent, Appendix 2.2.7.

TLC: TLC of alcoholic extract on silica gel "G plate" using Toluene: Ethyl acetate (7:3) shows under UV (366 nm) three fluorescent zones at Rf 0.34 (sky blue), 0.63 (sky blue) and 0.78 (blue). On spraying with 10% Methanolic-Sulphuric acid reagent and heating the plate for 10 minutes at 105^0C shows three spots at Rf. 0.63(grey), 0.78 (brownish-grey) and 0.96 (brown).

Aa'a mal-e-Adviya (Pharmacological Action): Qabiz (Constipative); Mughlliz e Mani (Inspissant to Semen)

Muhall-e- Istamalat (Therapeutic uses): Ishal (Diarrhoea); Jaryan (Spermatorrhoea); Zaheer (Dysentry); Zofe Bah (Sexual Debility)

Meqdar-e-Khorak (Dose):2-5 gm

Side effects/ adverse effects: GI disturbances.

Important formulations: Unknown

REHAN

(Leaf)

Ocimum sanctum is commonly known as holy basilor tulsi,an aromatic perennial plant in the family belongs to family- Lamiaceae. It is native to the Indian subcontinent and widespread as a cultivated plant throughout the Southeast Asian tropics.

O**thers names:**

a. Botanical Name: *Occimum sanctum* Linn

b. Family: Lamiaceae

c. Bengali Name: Tulsi

d. English Name: Holy Basil

Description

a. General**:** Barg Rehan consists of dried leaf of *Ocimum sanctum* Linn (Family Lamiaceae), an erect, 30-60 cm height, much branched, annual herb, found throughout the country.

Fig: No:8 : Tulsi

b. Macroscopic**:**Leaves 2.5-5 cm long, 1.6-3.2 cm wide, elliptic-oblong, obtuse or acute, entire or serrate, abs cent on both surfaces, petiolate, thin, petiole 1.5-3 cm long, hairy; odour , aromatic, taste, characteristic.

c. Microscopic**:**Petiole: shows cordate outline, consisting of single layered epidermis-composed of thin-walled, ova cells having a number of covering and glandular trichomes; covering trichomes multicellular, uniseriate 1-8 celled long, rarely slightly re flexed at tip; glandular trichomes short, sessile or with 1-2 celled stalk and 2-8 celled, balloon shaped head, enclosed in a cuticular bladder, measuring 22-27 micron diameter.upper epidermis followed by 3-4 layers of collenchymatous and 1-2 layers of parenchymatous cells. Lower epidermis followed by 1-3 layers of collenchymatous and 2-3 layers of parenchymatous cells; three vascular bundles situated centrally, middle onr larger than the other; two; consisting of xylem and phloem.

Midrib: Epidermis, trichomes arid vascular bundles similar to those of petiole, except reduced in cortical layers towards apical region of mid rib

Lamina: Epidermis and trichomes similar to those of petiole on both surfaces, stomata anomocytic and diameter cytic present on both surfaces and slightly raised above the level of epidermis; palisade single layered followed by 4-6 layers of closely packed spongy parenchyma with chloroplasts and oleo-resin; stomata index 10-13-15 on upper surface and 14-15-16 on lower surface; palisade ratio 3.8; vein islet number 31-33.

Powder**:** Light green; shows fragments of polygonal, less walled epidermal cells in surface view, covering and glandular trichomes as a whole or in pieces, palisade and spongy parenchyma, anomocytic and diameter cytic stomata.

Parts used: Leaf

Habitat: Indian subcontinent and Southeast Asian tropics.

Chemical Constituents: Essential oil (Carvacrol, caryophyllene, Nerol and Camphene etc)

Afa'al-e-Adviya (Pharmacological activities):

Antimicrobial activity: In 1952 Joshi and Rao studied its activity against pathogens like *Escherichia coli, Staphylococcus aureus, Bacillus anthracis, Bacillus subtilis, Salmonella spp., P. vulgaris, Pseudomonas aeruginosa* and *Mycobacterium tuberculosis* and found its

activity against *E. coli, Klebsiella aerogens, Proteus mirabilis, Salmonella typhimurium, Shigella dysentriae, Vibrio spp., P. aeruginosa, cholera* and *S. aureus*.

In 2008 Jabeen et al. found activity against *Pasturella multocida, E. coli, S. aureus, B. subtilis and Salmonella typhi, Salmonella paratyphi A* and *Salmonella typhimuriuum and E. coli, Klebsiella spp., B. subtilis, S. aureus*.

O. sanctum is also active against resistant strains of *Neisseria gonorrhea*, the fixed oil has an efficient good antibacterial activity against *Bacillus pumilus, P. aeruginosa and S. aureus*.

Anticancer activity: *O. sanctum* provides a protective effect on DNA from harmful radiations.It is significantly useful against a variety tumorigenesis states. The administration of aqueous and alcoholic extracts of *O. sanctum* to mice having Solid Sarcoma-180 tumors leads to a considerable reduction in tumor size.

Anti-inflammatory and free radical scavenging activity: It is also play a crucial role in reducing certain type of cancerous cell growth. It has an anti-inflammatory, cyclooxygenase inhibitory and antioxidant activity. O. sanctum increases the production and storage of glutathione and produces an increase in glutathione-S-transferase activity by approximately 78% in mice.

Immunomodulatory activity: Modifications in the humoral immune response in rats was observed when treated with distilled extract of fresh leaves attributing to mechanisms like antibody production, tissue responses, release of mediators of hypersensitivity in specific organs. Seed oil was observed to regulate both cell mediated and humoral immune response. The GABA pathways may demonstrate the immunomodulatory effects. Tulsi enhances both cellular and humoral immunity. Mukherjee et al. stated that aqueous extract of leaf had immunotherapeutic potential in sub-clinical trials of bovine during intra-mammary aqueous extract infusion and it was also stated that Ocimum sanctum L. aqueous extract produces a reduction in the bacterial total count and an increase in the count of neutrophil and lymphocyte and demonstrated a good phagocytic ability. Mediratta et al. studied the immunomodulatory effects produced by O. sanctum L. seed oil in both non-stressed as well as stressed animals for some immunological parameters. Consequently, it was stated that Tulsi seed regulates both humoral and cell-mediated immune responses mediated by GABAergic pathway.

Antifungal activity: Tulsi is effective against *Aspergillus fumigates, Aspergillus Niger, Candida albicans, Cryptococcus neoformans, Microsporum cassis, Sporotrichum schenkii.* 0.3 g of the essential oil/250 g grains showed best repellent activity against Sitophilus Fungal pathogens are always hard nuts to crack in medical sciences. Scientists have tried extract of Ocimum sanctum against some well-known fungal agents as *C. albicans, Aspergillus flavus and aflatoxin B1 (AFB1) production , A. niger, Aspergillus repens, Curvularia lunata* and *Fusarium moniliforme.*

Hepatoprotective activity: By acting as a part of detoxifying system, it improves the elimination of toxic chemicals and act as a hepatoprotective agent. The study showed that when alcoholic extract of Tulsi plant orally administered, it exhibited hepatoprotective effect against Paracetamol, Carbon tetrachloride and anti-tuberculosis drugs induced liver injury in albino rats. When extract of Ocimum sanctum were used in male albino rats weighing 100-150 g of Wistar strain (5-6 weeks) the level of enzymes was reduced. Biometry Research Unit, Indian Statistical Institute, 203 revealed that cold water extract of Tulsi plant produced hepatotonic effect against Paracetamol and Carbon tetrachloride when albino rats fed orally for 6 days with Tulsi extract. When Tulsi extract is used as adjunct with silymarin it show significant hepatoprotective effect.

Antiviral activity: The essential oils like Eugenol of Tulsi leaves produce anti-viral activity. Different types of extracts of Ocimum sanctum have anti-viral activity against different viruses e.g. Hematopoietic Necrosis Virus (IHNV) polio virus type 3 , herpes virus (HSV), hepatitis B virus, New castle Disease Virus. Ethanolic extract of Tulsi plant leaves in a range of 22.5 mg/ml concentration inhibit replication of polio type 3 virus in VERO cells.

Wound healing activity: Wound healing activity of *Ocimum sanctum* is also proved by using two different types of concentration (200 and 400 mg/kg) in rats. The models of wound used for this study are: the excise, the incise and dead space wound model. By using Van Gieson and Masson Trichome strains in histological examination of determination of granuloma tissue, it is found that Ascorbic acid, Hexose amine, L-Hydroxyproline and Malondialdehyde isolated from Tulsi has wound healing activity. Tulsi can be used as adjunct therapies for the burn wound management many studies supporting its use in healing

Antipyretic activity: The antipyretic activity of the fixed oil was tested against typhoidparatyphoid A/B vaccine-induced pyrexia. It was observed that the reduction in

febrile response indicates the it's antipyretic activity, the fixed oil possesses a prostaglandin inhibitory activity.

The *Ocimum sanctum L*. has also been suggested to possess antifertility, anticancer, antidiabetic, antifungal, antimicrobial, hepatoprotective, cardioprotective, antiemetic, antispasmodic, analgesic, adaptogenic and diaphoretic actions. Eugenol (1-hydroxy-2-methoxy-4-allylbenzene), the active constituent present in *Ocimum sanctum L.*, has been found to be largely responsible for the therapeutic potentials of Tulsi.

Diverse and various activities of carvacrol have been shown; such as antioxidant, antimicrobial, antitumor, anti mutagenic, anti genotoxic, analgesic, antispasmodic, anti-inflammatory, an giogenic, anti parasitic, anti platelet, AChE inhibitory, anti elastase, insecticidal, anti hepatotoxic or hepatoprotective.

Mizaj (Temperament): Hot 1^0 and Dry 1^0

Musleh (Corrective): Sirka, sosha and khorfa shak

Badal (Proximal substitute): Kalo tulsi.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 19 percent, Appendix 2.2.3
Acid-insoluble ash	: Not more than 3 percent, Appendix 2.2.4.
Alcohol soluble extractives	: Not less than 6 percent, Appendix 2.2.6.
Water soluble extractive	: Not less than 13percent, Appendix 2.2.7.
Essential Oil	: Not less than 0.2 percent, Appendix 2.2.8

TLC: TLC of alcoholic extract of the drug on Silica gel "G plate" using Toluene : Ethyacetate (9:1) shows in visible light nine spots at Rf 0.03(dark green),0.04, 0.08 (both green), 0.12 (light green), 0.21, 0.33 (both green), 0.45 (yellowish green), 0.85 & 0.93 (both light green). Under DV (366 nm eight fluorescent zones appear at Rf.004, 0.30, 0.33, 0.45, 0.83 (all pink), 0.85 (blue), 0.93 (pink) & 0.98(blue) and 0.98. On exposure to Iodine vapoureleven spots appear at Rf 0.04, 0.08, 0.12, 0.21, 0.33, 0.45, 0.54;0.75, 0.83, 0.88 and

0.93 (all yellow).On spraying with Vanillin-Sulphuric acid reagent and heating the plate for 10 minutes at 110^0C shows ten spots appear at Rf 0.08(violet), 0.12 (light violet), 0.21 (brown), 0.33 (violet), 0.45 (violet), 0.54 (blue), 0.75 (violet), 0.83 (blue), 0.93 (violet), and 0.98 (blue). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Mufarreh wa muqabbie Qalb, Muqabbi e Meda, Mudire Baul wa Haiz, Muhallile Auram; Munaffise Balgham.

Muhall-e- Istamalat (Therapeutic uses): Wajaul gosh, Khafqan, Ehtebase Haiz, Zofe Meda and Sual.

Meqdar-e-Khorak (Dose):1-2 gm (dry leaf); 5-6 gm (in juice form)

Side effects/ adverse effects: Headache and decrease vision.

Important formulations: Khamira Abresham Ood Mastagiwala and Arq Maul Laham Ambori

SAD KUFI

(Rhizome)

Cyperus rotundus is a species of sedge (Cyperaceae) native to Africa, southern and central Europe (north to France and Austria), and southern Asia.It is a perennial plantthat may reach a height of up to 140 cm (55 in). As in other Cyperaceae, the leaves sprout in ranks of three from the base of the plant, around 5–20 cm (2–8 in) long. The flower stems have a triangular cross-section. The flower is bisexual and has three stamina and a three-stigma carpel, with the flower head having three to eight unequal rays. The fruit is a three-angled achene.The root system of a young plant initially forms white, fleshy rhizomes, up to 25 mm (1.0 in) in dimension, in chains. Some rhizomes grow upward in the soil, then form a bulb-like structure from which new shoots and roots grow, and from the new roots, new rhizomes grow. Other rhizomes grow horizontally or downward, and form dark reddish-brown tubers or chains of tubers..

Other names:

a. Botanical Name: *Cyperus rotundus*Linn

b. Family: Cyperaceae

c. Bengali Name: Nagar Mutha

d. English Name: Nut grass.

Description

a. General: The drug Saad Kufi consists of dried rhizome of *Cyperus rotundus* Linn belongs to Family-Cyperaceae found throughout the country in waste grounds, garden and roadsides up to altitude of 1800 m.

Fig: No.9: Nagar Mutha

b. Macroscopic: Drug consists of rhizome and stolon having a number of wiry roots, stolon 10-20 cm long having a number of rhizomes, crowded together on the stolons, rhizomes bluntly conical and vary in size and thickness, crowned with the remains of stem and leaves forming a scaly covering, dark brown or black externally, creamish-yellow internally, odor-pleasant.

c. Microscopic: Rhizome shows single layered epidermis followed by 2-6 layers , subrised sclerenchymatous cells, epidermis and outer sclerenchymatous layers filled with dark brown content; ground tissue of cortex consists of circular to oval, thin-walled parenchymatous cells with small intercellular spaces; a few fibro-vascular bundles present in the region, endodermis distinct and surrounding the stele; wide central zone; beneath endodermis, composed of circular to oval, thin walled parenchymatous cells with intercellular spaces, numerous collateral, closed, vascular bundles surrounded by bundle sheath; scattered in this region; vessels narrow having simple reticulate and scalariform thickening and oblique pore, simple round to ocal starch grains measuring 6-28 micron in diameter a number of pigmented cells filled with reddish-brown content, present throughout the cortex and stele.

d. Powder**:** Creamish-brown; shows reddish-brown cells, reticulate and simple pitted vessels; fiber –like closely packed sclerified cells; narrow vessels with scalariform thickening and oblique pore from the remnants of leaves simple, round to oval, starch grains. Measuring 6-28 micron in diameter.

Parts used: Rhizome

Habitat: Africa, southern and central Europe (north to France and Austria) and southern Asia. **Chemical Constituents:** Alpha-cyperone (11.0%), myrtenol (7.9%), caryophyllene oxide (5.4%) and beta-pinene (5.3%) were major compounds in the oil of sample A. The main constituents of the oil of sample B were beta-pinene (11.3%), alpha-pinene (10.8%), alpha-cyperone (7.9%), myrtenol (7.1%) and alpha-selinene (6.6%).

Afa'al-e-Adviya (Pharmacological activities):

Anti Inflammatory Activity: The alcoholic extract (70% alcohol) possessed anti inflammatory activity against carrageenan induced oedema and also found effective against formaldehyde induced arthritis in albino rats. In another study the petroleum ether extract of the rhizomes showed anti-inflammatory activity against carrageenan induced oedema in albino rats. The triterpenoid obtained by chromatographic separation from petroleum ether extract revealed a high potent anti-inflammatory activity. This terpenoid was also found to possess significant antipyretic and analgesic effects similar to acetyl salicylic acid. *C.rotundus* has also reported as protective in inflammatory bowel disease. In addition, the extract suppressed the production of O2- by phorbol ester stimulated RAW 264.7 cells in dose- and timedependent manners. Collectively, these results suggest that the methanol extract of rhizomes *of C. rotundus* could be developed as anti-inflammatory candidate for the treatment of inflammatory diseases mediated by overproduction of NO and O2.

Analgesic activity: The petroleum ether extract and essential oil of *C.rotundus* are reported to possess analgesic activity. The ethanolic extract of *C. rotundus* showed potent tranquilizing activity in various tests: reduced the spontaneous motor activity, potentiated the pentobarbital narcosis and deranged the motor coordination, abolished the conditioned avoidance response in animals.

Anti-emetic activity: The ethanolic extract of *C. rotundus* in the dose of 128.1± 11.6 mg/kg was found to protect 50% dogs against apomorphine induced vomiting.

Antispatic activity: Ethanolic extract of *C. rotundus* produced relaxation of rabbit ileum and spasmolytic effect against contractions induced by acetylcholine, barium chloride and 5-hydroxitriptamine, showing a direct relaxant action on the smooth muscle

Hepatoprotective activity: Ethyl acetate extract and two crude fractions, solvent ether and ethyl acetate, of the rhizomes of *C. rotundus* (Cyperaceae) were evaluated for hepatoprotective activity in rats by inducing liver damage by carbon tetrachloride. The ethyl

acetate extract at an oral dose of 100 mg/kg exhibited a significant protective effect by lowering serum levels of glutamic oxaloacetic transaminase, glutamic pyruvic transaminase, alkaline phosphatase and total bilirubin. These biochemical observations were supplemented by histopathological examination of liver sections. Silymarin was used as positive control.

Gastroprotective activity: *C.rotundus* extract protected against gastric mucosal injury induced by ischemia and reperfusion in rats. The mean ulcer index of rats treated with 200 and 100 mg/kg *C. rotundus* were significantly lower than that of control. The activities of glutathione-peroxidase and malondialdehyde were significantly affected by treatment of *C. rotundus*.

Mizaj (Temperament): Cold $2^0$and Dry2^0

Musleh (Corrective): Unknown

Badal (Proximal substitute): Mutha

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent Appendix 2.2.2.
Total Ash	: Not more than 8 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 4 percent, Appendix 2.2.4.
Alcohol soluble extractive	: Not less than 5 percent, Appendix 2.2.6
Water soluble extractive	: Not less than 11 percent, Appendix 2.2.7.
Volatile oil	: Not less than 1 percent, Appendix 2.2.8

TLC: TLC of alcoholic extract on silica gel "G plate" using Toluene: Ethyl acetate (9:1) shows under UV (366 nm) a fluorescent zones at Rf 0.88 (blue). On the exposure to iodine vapour three spots appear at Rf 0.44 0.559 and 0.73(all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate for 10 minutes at 105^0C shows three spots at Rf. 0.44, 0.55 and 0.73(all violet).2.2.10

Aa'a mal-e-Adviya (Pharmacological Action): Muqabbie Demagh, Muqabbie Asab, Kasire Riyah and Mudire Baul wa Tams.

Muhall-e- Istamalat (Therapeutic uses): Zofe Meda, Zofe Asab, Zofe Dimagh, Nisyan and Yarqan

Meqdar-e-Khorak (Dose): 3-7 gm

Side effects/ adverse effects: No significant adverse effects has been observed.

Important formulations: Anqaya Sagheer, Anasdaro, Anasdaro lububi, etrifale didan; Jawarish Jalinus and Dawae Bawaseer. Majune Chobchini.; Majun Jalinus e Lububi.Majune Nisyan.

SAHTARA

(Whole plant)

Fumaria parviflora is a species of flowering plant known by the common names fineleaf fumitory, fine-leaved fumitory and Indian fumitory. It is native to Europe, Asia, and Africa, but it is common and widely distributed in many other parts of the world. It is sometimes weedy. The small flowers are dull white with purple tips. The fruit is a rounded nutlet with a central crest.

Other names:

a. Botanical Name: *Fumaria parviflora*

b. Family: Fumaraceae

c. Bengali Name: Khet papra

d. English Name: Fine leaf fumitory

Description

a. General**:**The drug Shahatara consists of dried whole plant of *Fumaria Parviflora* belongs to Family Fumaraceae, a pale green, branched, annual, diffuse herb about 60 cm high, distributed as a weed of cultivated fields over the greater parts of the country, and also commonly growing on road sides during cold season.

Fig:No: 30: Sahatara

b. Macroscopic:Root –Buff or cream colored, branched about 3 mm thick, cylindrical, taste-bitter; stem-light green, smooth, diffused, hollow about 2 to 4 mm thick; taste- bitter and slightly acrid; Leaf-compound, pinnatifid 5 to 7 cm long, divided into narrow segments; segments 5 mm long and about 1 mm broad, liner or oblong, more or less glaucous, acute or subacute, petiole very thin, 2.5 to 4 cm long; taste bitter. Flower-Racemes with 10 to 15 flowers, peduncle up to 3 mm; pedicle about 2 mm, flowers about 7 mm long; bract much longer than the pedicles; sepals white about 4 mm long, triangular ovate, acuminate; corolla in 2 whorls with very small 4 petals; each about 4 mm long; inner petals with a purple or green tip; outer petals with narrow spur; without purple spots stamen 3+3; staminal sheath subulate above; about 4 mm long; stigma 2 lipped. Fruit-capsule, 2 mm long and slightly broader; sub rotund; obovate, obtuse and sub truncate, obscurely, apiculate; rugose when dry; nublets globos, up to 2 mm long, single seeded.

c. Microscopic:Root shows single layer epidermis followed by 5 or 6 layers of cortex consisting of thin walled, rectangular, parenchymatous cells, outer 1 or 2 layers irregular and brown in color; endodermis not distinct. Secondary phloem very narrow and consisting of 2 or 3 rows with usual elements; central core shows a wide zone of xylem and consists of usual elements; vessels mostly solitary having reticulate and spiral thickening, medullary ray less developed and mostly uniseriate; fibers moderately long, thick walled having narrow lumen and blunt tips. Stem- shows a pentagonal outline, having prominent angles composed of collenchymatous cells; epidermis single layered of thin walled, oblong-rectangular cells, covered with thin cuticle; cortex narrow; composed of 2 to 4 layers of chlorenchymatous cells endodermis not distinct; vascular bundles collateral, 5 or 6 arranged in a ring; each vascular bundle capped by a group of sclerenchymatous cells; phloem consists of usual elements; xylem consists of vessels; tracheids, fibers and xylem parenchyma; vessels much elongated, having reticulate, annualr or spiral thickening or simple pits; xylem fibers narrow elongated with pointed ends having a few simple pits; center either hollow or occupied by narrow pith consisting of thin walled, parenchymatous cells. Leaf-petiole V chaped outline; single layer epidermis consisting a thin walled parenchymatous cells followed by ground tissue composed of thick walled round, oval or polygonal parenchymatous cells; outer cells smaller than inner; collenchymatous cells present at corners; three vascular bundle scattered in ground tissue, one central and two in wings; vascular bundle consists of phloem and xylem, phloem capped with fibrous sheath, lower epidermis single layered. Lamina shows single layer epidermis, on either side, consisting of thin walled, rectangular, oval shaped, parenchymatous cells;

mesophyll composed of oval to polygonal thin walled parenchymatous cells, filled with green pigment and not differentiated into palisade and spongy parenchyma; vascular bundles scattered throughout the mesophyll; stomata anomocyte; present on both surface.

Powder:Light greenish-brown; shows fragments of parenchyma; tracheids, fibers and vessels having simple pits and spiral thickening; anomocytic stomata and wavy walled epidermal cells in surface view.

Parts used: Whole plants

Habitat: Europe, Asia, and Africa

Chemical Constituents: Alkaloid, Tannins, Sugars and salt of potassium.

Afa'al-e-Adviya (Pharmacological activities):

Ant-inflammatory and Analgesic activity: Study showed significant anti-inflammatory activities of Fumaria indica in carrageenan-induced edema and cotton pallet granuloma even after their lowest tested doses. Significant analgesic activities was also observed in hot plate and tale flick tests.

Cognitive Modulating Activity: Fumaria indica showed dose-dependent decrease in brain AChE activity and increase in muscarinic receptor density, and such was also the case for its observed beneficial effects on the brain antioxidative status. Fumaria indica also inhibited the scopolamine-induced overexpression of the three tested cytokines observed in rat's brain. It also possesses nootropic-like beneficial effects on cognitive functions.

Antianxiety activity: Study strongly suggest that Fumaria indica is a functionally novel type of antianxiety agent, and that inhibition of cytokine expressions in the brain could be involved in its mode of action.

Chemoprotective activity: Experimental observations powerfully supports that F. indica exerts chemopreventive effect by suppressing the tumor burden and restoring the activities of hepatic cancer marker enzymes on NDEA and CCl4- induced hepatocarcinogenesis in Wistar rats.

Anti-inflammatory and anti-nociceptive activity: Oral administration of F. indica dry extract (100, 200 and 400 mg kg1) exhibited dose dependent and significant anti-inflammatory activity in acute (carrageenean and histamine induced hind paw oedema, $p < 0.05$) and

chronic cotton pellet granuloma models of inflammation, $p < 0.01$). A significant anti-nociceptive activity was evidenced in mice; 6.6-67.7% ($p < 0.01$) protection in mechanical, 33.9-125.1% ($p < 0.05$) protection in thermal induced pain and 22.2-73.9% ($p < 0.05$) protection in acetic acid-induced writhing.

Antifungal activity: The alkaloid fuyuziphine isolated from the whole plant of Fumaria indica showed inhibitive effect against spore germination of some plant pathogenic fungi (Collectotrichum sp., C. gloeosporioides, C. falcatum, Curvularia maculans, C. lunata, Erysiphe cichoracearum, Helminthosporium pennisetti, Oidium erysiphoides, Ustilago cynodontis, Alternaria chieranthi, A. melongenae, A. brassicicola and A. solani). Curvularia lunata, Oidium erysiphoides, Alternaria brassicicola and A. solani did not germinate at 750 and 1000 ppm and Colletotrichum gloeosporioides, C. falcatum, Curvularia maculans were inhibited at 1000 ppm for 24 hr incubation. Germination of most fungi was significantly inhibited at 100~750 ppm.

Antihelminthic activity: Ethanolic extracts of the whole plant of Fumaria parviflora (Papaveraceae) showed an anthelmintic efficacy of up to 93%, relative to pyrantel tartrate. Ethanol extract of F. parviflora caused a strong reduction of the faecal egg counts (100%) and a 78.2 and 88.8% reduction of adult H. contortus and T. colubriformis on day 13 post-treatment. The extract was as effective as the reference compound pyrantel tartrate.

Spasmogenic and spasmolytic activity: The crude extract of Fumaria indica whole plant (Fi.Cr) and its fractions showed spasmogenic and spasmolytic. Data indicate that the presence of cholinergic and CCB constituents in Fumaria indica may explain the respective traditional use of Fumaria indica in constipation and diarrhea.

Mizaj (Temperament): Hot $2^0$and Dry 2^0

Musleh (Corrective): Kasni / Kasni juice**.**

Badal (Proximal substitute): Gima shak.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 30 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 10 percent, Appendix 2.2.4.

Alcohol soluble extractives : Not less than 7 percent, Appendix 2.2.6.

Water soluble extractive : Not less than 29 percent, Appendix 2.2.7.

TLC: TLC of alcoholic extract on silica gel "G plate" using Chloroform: Methanol (8:2) shows under visible light one spot at Rf 0.93 (green). Under UV (366 nm) eight fluorescent zones are visible at Rf 0.07 (blue); 0.13 (blue); 0.29 (light blue), 0.50 (light pink), 0.60 (light yellow), 0.67 (yellow), 0.79 (blue) and 0.93 (pink). On the exposure to iodine vapour twelve spots appear at Rf 0.07; 0.10, 0.13; 0.19, 0.29, 0.50, 0.60, 0.67, 0.74, 0.79, 0.86 and 0.93 (all yellow). On spraying with D reagent and heating the plate for Dragendroff reagent followed by 5% Methanolic-Sulphuric acid reagent one spot appears at Rf.0.07 (orange). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Musaffe-Dam (Blood purifier); Mudire Baul (Diuretic) and Mulliyan (Laxative)

Muhall-e- Istamalat (Therapeutic uses): Atishak (Syphilis); Busoor (Acne); Suzak (Gonorrhoea) and Humma (Fever).

Meqdar-e-Khorak (Dose):5-7 grams

Side effects/ adverse effects: Excess may be harmful for pulmonary diseases.

Important formulations: Itrifal Shahatara and Arq-e-Shahatara; Majune Juzam

SANBHALU

(Leaf)

Vitex negundo, commonly known as the Chinese chaste tree, five-leaved chaste tree, or horseshoe vitex, is a large aromatic shrub with quadrangular, densely whitish, tomentose branchlets. It is widely used in folk medicine, particularly in Southand Southeast Asia. *Vitex negundo* is an erect shrub or small tree growing from 2 to 8 m (6.6 to 26.2 ft) in height. The bark is reddish brown. Its leaves are digitate, with five lanceolate leaflets, sometimes three. Each leaflet is around 4 to 10 cm (1.6 to 3.9 in) in length, with the central leaflet being the largest and possessing a stalk. The leaf edges are toothed or serrated and the bottom surface is covered in hair.[3] The numerous flowers are borne in panicles 10 to 20 cm (3.9 to 7.9 in) in length. Each is around 6 to 7 cm (2.4 to 2.8 in) long and are white to blue in color. The petals are of different lengths, with the middle lower lobe being the longest. Both the corolla and calyx are covered in dense hairs.

Other names:

a. Botanical Name: *Vitex negundu* Linn

b. Family: Verbenaceae

c. Bengali Name: Nishinda

d. English Name:Chinese chaste tree/negundo

Description

a. General**:** The drug Sambahalu consists of dried leaf of belongs to *Vitex negundu* Linn belongs to family verbenaceae, a large aromatic shrub or small tree up to 4.5 m in height, common through the country ascending to an altitudes of 1500 in the outer Himalayan. It is common in waste places around villages, river banks, and moist localities and in the deciduous forests.

Fig: No. 10: Nishindha Leaf

b. Macroscoypic:Leaves palmately compoundpetiole 2.5 : 3.8 cm long, mostly trifoliate, occasionally pentafoliate in trifoliate leaf, leaflet lanceolate or narrowly lanceolate, middle leaflet 5-10 cm long and 1.6-3.2 cm broad with 1-3 com long petiolule, remaining two sub-sessile, in pentafolaiate leaf inner three leaflets have petiolule and remaining two sub-sessile, surface glabrous above and tomentose beneath and texture leathery.

c. Microscopic**:**Petiole: shows single layered epidermis having a number of unicellular , bicellular and uniseriate multicellular covering trichomes and also glandular trichomes with uni tri cellular stalk and uni to bi cellular head ; cortex composed of outer collenchymatous tissue and inner 6:8 layers of parelichymatous tissue, collenchyma well developed in basal region and gradually decreases in middle and apical regions; pericyclic fibers in basal region of petiole present in the form a a discontinuous ring in apical region surrounding central horse shoe-shaped vascular bundle; a few smaller vascular bundles present ventrally between arms of central vascular bundle and two or rarely three, bundles situated outside the arms.

Lamina**:** Shows single layered epidermis having mostly unicellular hairs bi and multicellular and glandular trichomes being rare, hypoderms 1:3 layered interrupted at places by 4-8 palisade layers containing chlorophyll: a large number of veins enclosed by bundle sheath traverse mesophyll; stomata present only on the ventral surface, covered densely with trichomes; vein-islet and vein termination number of leaf are 23-25 and 5-7 respectively.

d. Powder**:** Shows number of pieces of whole, uni –bi and multicellular covering trichomes, glandular trichomes, palisate tissues with hypodermis and upper and lower epidermis, xylem vessels with pitted wells.

Parts used: Leaf

Habitat: Bangladesh and Indian subcontinent.

Chemical Constituents: The chemical composition of the volatile oil from flowering twigs of *Vitex negundo L.* growing at Dehra Dun (India) was determined by gas chromatography-mass spectrometry. It indicated the presence of 94 compounds, of which 28 compounds, consituting 57.53% of the oil, were identified. The main compounds identified are viridiflorol (26.52%), p-caryophy/lene (13.20%), 4-terpineol (4.46%), linalool (2.04%), globulol (1.82%), elemol (1.48%), fJ-farnesene (1.38%) and aromadendrene (1.04%). The oil from flowering twigs contains higher amount of viridiflorol (26.52%) than from leaves (19.55%), and thus can be a better source of natural viridiflorol.

Afa'al-e-Adviya (Pharmacological activities):

Anti-Inflammatory and Analgesic activity: Mahalakshmi et al., (2010) studied that the sub-effective dose of *Vitex negundo* potentiated anti-inflammatory activity of phenylbutazone and ibuprofen significantly in carrageenin induced hindpaw oedema and cotton pellet granuloma models. The potentiation of anti-inflammatory activities phenylbutazone and ibuprofen by *Vitex negundo* Linn. indicates that it may be useful as an adjuvant therapy along with standard anti-inflammatory drugs. In another study Yunos et al., and Jana et al., established anti-inflammatory properties of *Vitex negundo* extracts in acute and sub-acute inflammation which are attributed to prostaglandin synthesis inhibition.

Antinociceptive activity: Gupta et al., (2005) were studied that the tail flick test in rats and acetic acid induced writhing in mice were employed to study the antinociceptive activity of ethanolic leaf extract of *Vitex negundo* Linn. (100, 250 and 500mg/kg, p.o). The effect was compared with meperidine (40 mg/kg, sc) in tail flick method and aspirin (50 mg/kg, p.o) in writhing test as a standard control respectively. An interaction with naloxone hydrochloride was also studied in tail flick method for its mechanism of central analgesic action. It showed significant analgesic activity in dose dependent manner in both the experimental models. It suggested that Vitex negundo Linn. possesses both central and peripheral analgesic activity.

The central analgesic action does not seem to be mediated through opioid receptors. It may prove to be a useful adjuvant therapy along with standard analgesic drug.

CNS Depressant activity: Ladda and Magnum (2012) showed a methanolic extract of the leaves of *Vitex negundo* Linn was found to significantly potentiate the sleeping time induced by pentobarbital sodium, diazepam and chlorpromazine in mice.

Antifungal activity: Sathiamoorthy et al., (2007) studied that bioactivity guided fractionation of ethanolic extract of leaves of *Vitex negundo* resulted in the isolation of new flavone glycoside along with five known compounds. All the isolated compounds were evaluated for their antimicrobial activities. The new flavone glycoside and compound 5 were found to have significant antifungal activity against Trichophyton Mentagrophytes and Cryptococcus neoformans at 6.25 µg/m

Antiallergic activity: Ladda and Magdum (2012) showed that the ethanolic extract of *Vitex negundo* have antiallergic activity against immunologically induced degranulation of mast cells. It also inhibited edema during active paw anaphylaxis in mice. The extract significantly inhibited both the initial and later sustained phases of tracheal contractions. The initial phase was primarily due to histamine and the latter phase was due to release of lipid mediators from arachidonic acid. Inhibition of the latter phase may be secondary to inhibition of arachidonic acid by the ethanolic extract.

Hypoglycemic activity: Villasenor and Lamadrid (2006) have provided an account of the antihyperglycemic activity of *Vitex negundo* Leaf extracts.

Mizaj (Temperament): Hot 2^0 and Dry 2^0

Musleh (Corrective): Babla/ Katira

Badal (Proximal substitute): Neem leaf

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 8 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 1 percent, Appendix 2.2.4.
Alcohol soluble extractive	: Not less than 10 percent, Appendix 2.2.6.

Water soluble extractive : Not less than 20 percent, Appendix 2.2.7.

TLC: TLC of alcoholic extract on silica gel "G plate" using Toluene: Ethyl acetate (9:1) shows under UV (366 nm) two fluorescent zones at Rf 0.18(blue), 0.47 (red). On the exposure to iodine vapour four spots appear at Rf0.16, 0.47, 0.67 and 0.91 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate for 10 minutes at 105^0C shows four spots at Rf. 0.07, 0.47, 0.58 and 0.67 (all blue).Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Jali, Musakkine Waja, Muhalilla Aurame Sulba and Dafe Taffun.

Muhall-e- Istamalat (Therapeutic uses): Wajaul Halaq, Qurooh Fam; Warme Raham; Warme Miqad; Warme Khusyatain and Qurooh Mutaffin**.**

Meqdar-e-Khorak (Dose): For local application

Side effects/ adverse effects: Headache, Dizziness, Nausea, irritation, Vomiting and excess use may be harmful for kidney.

Important formulations: Raughan –e-Hafte Barg; Etrifale Didan; Majune Aoza.

SANBHALU

(Fruit)

The drug Sanbhalu consists of fruits of *Vitex negundo* Linn. Syn. Vitex bicolor Willd. (Verbenaceae); a small tree or shrub, 4 to 5 m in height, found throughout India, fairly common in waste land, on road side, on the bank of streams or in moist places near deciduous tbrests and also cultivated in garden as a hedge plant.

Other names:

a) Botanical name: *Vitex negundo* Linn. Syn. *Vitex bicolor* Willd.

b) Family : Verbenaceae

c) Bengali name: Nisinda, Samalu, Nirgundi

d) English name: Negundo

Description:

a) General: Vitex negundo is a much-branched shrub up to 5 m tall or sometimes a small, slender tree with thin, gray bark.

Leaves: Palmately compound petiole 2:5, 3.8 cm long; mostly trifoliate, occasionally pentafoliate; in trifoliate leaf, leaflet lanceolate or narrowly lanceolate, middle leaflet 5- 10 cm long and 1.6, 3.2 cm broad, with 1- 1.3 cm long petiolule, remaining two sub-sessile; in pentafoliate leaf inner three leaflets have petiolule and remaining two sub-sessile; surface glabrous above and tomentose beneath; texture leathery.

Roots: Cylindrical, hard, tough with irregular fractures; external surface rough due to longitudinal, narrow, cracks and small rootlets; cut surface shows cork region greyishbrown, middle region greyish-white, and xylem region cream colored; bark thin, easily separates from wood; wood hard, forming major part of root.

Flowers: Bluish-purple, small, in peduncled cymes, forming large, terminal, often compound, pyramidal panicles.

Fruit: The fruit is a rounded drupe, 1 to 3 mm in diameter, 1/3 rd to 3/4 th of its size surrounded by a dull grey cup like, persistent calyx alongwith pedicel; calyx cup may show one or two vertical splits; fruit colour light brown to black; locules two, each containing two seeds; texture smooth, taste and odour not characteristic.

- Seeds: 5-6 mm in diameter.
- Flowering and Fruiting: Between June and December and from September to February.

- Part(s) used for medicinal purpose: Roots, root, flowers, leaves, bark.

b)Macroscopic: Fruit a drupe about 3 mm in size, ovoid, light brown to black in colour, tough, shiny and slippery, having four vertical ridges, dividing fruit in four halves; calyx gamosepalous. persistent, whitish brown, 5 sepals; pungent, aromatic odour and no specific taste.

c) Microscopic: Pericarp consists of a single layered epidermis, with wavy cuticle; epicarp 2 or 3 layered, parenchymatous slightly elongated cells; mesocarp parenchymatous,10 to12 layered; starch grains presentat definite intervals; groups of xylem cellsseen;endocarp parenchymatous 2 to 4layers fused with testa of the seed.The fruit wallencloses 4 seeds andseeds are separated by a false septum which is parenchymatous andis filled with aleurone grains. The seed is covered by testa and tegmen whichare fusedwith each other. The outer cells of the testa are parenchymatous and innercells arecollenchymatous, whereas, the cells of tegmen are made up ofsingle layered elongatedcells. The cells of testa and tegmen contain cluster of starch grains which are simple,spherical, having hilum at the center, with no striations. size 5 µ diameter. Calcium oxalate crystals are rhomboid, cuboid, hexagonal or prismatic in shape, ranging from 4 to 7 µ length and 4 to 6 µ in width.

Parts used: Leaves, leaf oil, Flowers bark, roots, fruits, and seeds.

Habitat: Grows in the country, common in waste places around villages, river banks, moistlocalities
and in the deciduous forests.

Phytoconstituents:
n-tritriacontane, n-nonacosane, p-hydroxybenzoic acid, n-hentriacontane, β-sitosteroL 3.4 dihydroxy benzoic acid, n-pentatriacontane.

Af'aal-e-Adviya (Pharmacological Activities):
Some of Af'aal-e-Adviya (Pharmacological Activities) are described here.
Hepatoprotective activity: In addition to the above mentioned activities Vitex negundo extracts have also been tested for a range of other systemic effects. Negundoside and Agundoside from Vitex negundo have been studied for their hepatoprotective activity. Extract of Vitex negundo is reported to decreases Serum Bilirubin, Aspartate, Aminotransferase , Alanine Aminotransferase, Alkaline Phosphates and Total Protein (TP) levels in case of liver damage. Leaf extracts of Vitex negundo were found to possess hepatoprotective activity against liver damage induced by d-galactosamine(Yang et. al., 1987), commonly used tubercular drugs and carbon tetrachloride (Tandon et. al.,2008).

Other activities: The aqueous extract of the plant is reported for its laxative effect (Tasduq et. al., 2008). Anti-histaminic activity of the plant against histamine release from mast cells has also been validated; the leaf extract have potential hypoglycemic activity mediated by inhibition of alpha-amylase (Devani et. al., 2013).

Antimicrobial activity: Study was carried to investigate the antimicrobial properties of the essential oil of leaves of *Vitex negundo*. The essential oil from leaves of *Vitex negundo* was tested against pathogenic microorganisms; *S. aureus, E.coli, K. pneumoniae, B. subtilis, M. luteus* and *Candida albicans*. The oil tested exhibited good antimicrobial activity against all the clinical isolates when compared with standard. Flavonoids from leaf extracts of Pongamia pinnata and leaf and seeds extracts of *Vitex negundo* were screened against *Bacillus cereus, Escherichia coli, Mycobacterium smegmatis, Proteus vulgaris, Pseudomonas aeruginosa, Salmonella typhimurium, Staphylococcus aureus, S. epidermidis, Candida albicans* and*Trichoderma viride* adopting disc diffusion method. Results were compared with the zone of inhibition produced by commercially available standard antibiotics. Maximum activity was observed in flavonoid extract of V. negundo leaves.

The methanol crude extract of *Vitex negundo* was fractionated with kupchan method and pet-ether and carbon tetrachloride were made for screening the antimicrobial and antitumor potentials using disc diffusion method and brine shrimp lethality bioassay respectively. An established antibiotic (Kanamycin, 30µg/disc) and cytotoxic agent (Vincristine sulphate) were used to compare the results. All the fractions showed most prominent zone of inhibition against a number of bacterial and fungal strains. Especially in comparison to the standard kanamycin, all fractions gave prominent zone of inhibition against *Bacillus subtilis, Bacillus megaterium, Salmonella typhi, Vibrio mimicus* and *a fungal strain, Aspergillus niger*.

Antibacterial activity:

The leaf extracts of *Vitex negundo* solvented by ethanol, showed the spectrum of inhibition on salmonella paratyphi. Most of the bacterial pathogens like *salmonella paratyphi, klebsiella pneumonia, vibrio cholera, streptococcus mutans* and *E.coli* were found to be susceptible in leaf extracts of the *Vitex negundo*. Petroleum ether leaf extract of *Vitex negundo* showed good activity against Salmonella paratyphi and entrobactor.

Antifungal activity:

In vitro antifungal activity of fruits of *Vitexs negundo* Linn., was examined against 5 common fungal strains, *Candida albicans, Candida glabrata, Aspergillus flavus, Microsporum canis* and *Fusarium solani*. Ethanol extract of fruit seeds showed significant activity

against *Fusarium solani* and moderate response against Microsporum canis with no effect on *Candida albicans*.

Anthelmintic activity:

Ethanolic extracts of *Moringa oleifera* and *Vitex negundo* were taken for anthelmintic activity against Indian earthworm *Pheritima posthuma*. Various concentrations of both extracts were tested and results were expressed in terms of time for paralysis and time for death of worms. Piperazine citrate (10 mg/ml) was used as a reference standard and distilled water as a control group. Dose dependent activity was observed in both plant extracts but *Moringa oleifera* shows more activity as compared to *Vitex negundo*.

Anti-oxidant activity:

Antioxidant activity of *Vitex negundo* (VN) extract was studied using 1,1-diphenyl-2-picrylhydrazyl (DPPH) and Ferric reducing or antioxidant power (FRAP) assays. The antiproliferative activity of VN extract against WRL68 and HepG2 was investigated based on methylthiazol tetrazolium (MTT) spectrophotometric assay. VN extract showed 79.43% inhibition of DPPH stable radical with IC_{50} 13.31 ± 0.18 µg/ml. This inhibition was too closed to butylated hydroxyl toluene (BHT) 82.53% (IC_{50}13.8 ± 0.14) and gallic acid 89.51% (IC_{50} 3.1 ± 0.08).

Antipyretic: The antipyretic activity of leaf extracts of *Vitex negundo* linn Plant was evaluated by using yeast induced pyrexia model in Wistar Albino rats. The data obtained indicate that the Petroleum ether and Methanolic extracts of a leaves of plant *Vitex negundo* linn, at dose of 300 mg/kg body weight per oral route (P.O) showed the significant reduction in yeast provoked elevated temperature. The antipyretic effects of the extracts were compared with standard drug paracetamol.

Antidiabetic activity: Aqueous and ethanol leaf extract of *Vitex negundo* was studied for its antidiabetic activity using alloxan induced diabetic model in rats. The aqueous extract showed ($P<0.01$) significant activity than the ethanol extract at the tested dose level, which were comparable to glibenclamide, a standard antidiabetic drug.

Antiflatulant: The different essential oils and extracts of *Vitex negundo* Linn was studied for its antiflatulent activity. The standard drug used was simethicone (10 mg/10 g of flatulent diet, p.o.), which inhibited gas production up to 90 % as compared to control. Addition of test drugs (essential oils/ethanolic extracts) to the chickpea diet (5 %) decreased the amount of gas production significantly up to 69% by root and leaves extracts while dry fruit oil inhibited gas formation to 81%. The antiflatulent activity in this plant may due to combined effect of flavonoids a nd triterpenoids constituents.

Wound Healing Activity: An aqueous extract was examined for its wound healing activity in the form of ointment in experimental wound models in albino rats. The studies included parameters like epithelization period, wound contraction, tensile strength of incision wounds. The results of the wound healing study with respect to the incision and excision wound models in rats revealed statistically significant wound healing activity ($p<0.05$) when compared to control and standard, which was evidenced by faster epithelization, increase in the tensile strength and hydroxyproline content.

Mizaj (Temperament): Hot 2^o - Dry 2^o

Musleh (correctives): Babool gum

Badal (Proximal substitute): Shahdana

Identity, purity and strength:

Foreign Matter	-	Not more than 2%,	Appendix 2.2.2.
Total Ash	-	Not more than 4%,	Appendix 2.2.3.
Acid insoluble ash	-	Not more than 1%,	Appendix 2.2.4.
Alcohol-soluble extractives	-	Not less than 2%,	Appendix 2.2.6.
Water-soluble extractives	-	Not less than 5%,	Appendix 2.2.7

TLC behavior of ethanolic extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Petroleum ether: Acetone : Methonol (75:24:1)	On spraying plate with 10% Methonolic H_2S0_4 and heated for 5 minutes at 105^o	4	0.09 0.13 0.17 0.43

Aa'maal-e-Adviya (Pharmacological Action):

Qatil Kiram, Daf-e-Taaffun, Mohallil-e-Warm, Muqawwi Basar.Jali, Musakkine dard, Muhallile waram,Mujaffif, Daf'e taffun, Mundamile qurooh, Mufatteh sudad, Mulattif, Kasire riyah,Daf'e humma,Mushtahi,Mukhrije deedan, Qatile deeda, Muqawwie baah.

Mahall-e-Istemalat (Therapeutic use):

Kirm-e-Shikam, Jndemal-e-Qurooh, Wajaul Halq, Qula, Warm-e-Reham, Warm-e-Khusyatain, Warm-e-Miqad.

Meqdar-e-Khorak (Dose): 3-5 g

Muzir (adverse effect): for Kidney, Mujaffif mani

Contraindications Vitex negundo is quite similar botanically to the better studied V. agnus-castus, and thus may have a similar range of contraindications, including the concurrent use of progesterogenic drugs and hormonereplacement therapies. Vitex promotes production of progesterone in the second half of the cycle. Also known as a contraceptive, it should not be taken before ovulation, as it may delay or prevent ovulation. The juice of the leaves is dangerous to young people as it brings down sexual emotions. Experimental data on animals and human studies have reported that phytocomponents of Vitex exhibit hormonal activities and may affect the pharmacological effects of hormonal medications. Reports indicate that Vitex affects endocrinal activity and may alter effects of medications and possibly doses needed for treatmentVitex may decrease the effect/effectiveness of oral contraceptives or female hormone replacement therapy. People with hormone dependent conditions as endometriosis, fibroids or cancers of the breast, uterus, and prostrate should not take it and it is not recommended during pregnancy. Dopaminergic effects of Vitex may be partly responsible for its prolactininhibiting actions and variable degree of binding occurs between crude extracts and diterpene fractions of Vitex. People with schizophrenia or where dopamine levels are affected should use Vitex under supervision of health professionals (Padmalatha et al., 2009).

Important formulations: Raughan-e-Haft-e-Barg Sufoof-e-Fanjankusht

SARSON

(Seed)

Brassica campestris is a bright yellow flowering plant that is part of the Brassicaceae family. It produces oil-rich seeds similar to those of the oil rapeseed, and is one of the higher-yield oil crops, making it an attractive option for vegetable oil cultivators.

Other names:

a. Botanical Name: *Brassica comperstris* Linn.

b. Family: Brassicaceae

c. Bengali Name: Sarisa

d. English Name: Mustard

Description

a. General: The drug Sarson consists of dried seeds of *Brassica comperstris* Linn (Family Brassicaceae), an erect, stout, simple or branched, glaucous, annual herb,50-60 cm tall with amplexicard leaves commonly cultivated in Bengal, Bihar, UP and Punjab and Bangladesh and also found occasionally as an escape waste places and fields.

Fig: No.11: Sarisha plant and Seed

b. Macroscopic:Seeds small, slightly oblong, pale or reddish-brown, bright, smooth, 1.2 -1.5 mm in diameter under magnifying glass, it is seen to be minutely reticulated, taste, bitter and sharp.

c. Microscopic**:** Seed shows single layered colorless testa followed by 3-5 layered, non-lignified hexagonal, thick-walled filled with yellowish-brown contents; embryo and endosperm consists of hexagonal, thin walled parenchymatous cells containing oil globules.

d. Powder**:** Yellow in color with brown particles and oily , slightly bitter and sharp in taste, shows frequently thick walled, fragments of reddish-brown cells of hypodermis, yellowish hyaline masses.

Parts used: Seeds

Habitat: Bangladesh and India

Chemical Constituents: Fixed oil.

Afa'al-e-Adviya (Pharmacological activities):

In vitro or in vivo pharmacological studies for the scheduled bioactive compounds from Brassica vegetables have exhibited a wide spectrum of biological activities, including antimicrobial, anticancer, antimutagenic, anti-inflammatory, neuroprotective and antioxidative activity and also some may act as the antinutritive effects on the human body.

The ethanol extracts of all the plant parts were found to be highly effective whereas the petroleum ether, methanol and ethyl acetate extracts of root, stem and leaves of *B. campestris* respectively exhibited a good antibacterial activity against all bacterial strains i. e. *Staphylococcus aureus, Bacillus cereus, Pseudomonas aeruginosa, Escherichia coli and Staphylococcus epidermidis* with the diameters of growth inhibition area in the range of 05 – 25 mm. The benzene and chloroform extracts of plant showed least antibacterial activity against the tested microorganisms. The results of this study support the use of these species in Indian traditional medicine to treat skin infections.

Mizaj (Temperament): Hot 3^0 and Dry 3^0

Musleh (Corrective): Sirka/kasni and groundnut oil**.**

Badal (Proximal substitute): Rai Sarisha

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total ash	: Not more than 5 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 0.5 percent, Appendix 2.2.4.
Alcohol soluble extractive	: Not less than 8 percent, Appendix 2.2.6.
Water soluble extractives	: Not less than 16percent, Appendix 2.2.7.
Fixed Oil	: Not less than 35 percent, Appendix 2.2.8.

TLC: TLC of alcoholic extract on silica gel "G plate" using Toluene: Ethyl acetate (9:1) shows under UV (366 nm) two fluorescent zones at Rf 0.12 and 0.59 (both blue). On the exposure to iodine vapour three spots appear at Rf 0.12, 0.59 and 0.70(all yellow). On spraying with Anisaldehyde-Sulphuric acid reagent and heating the plate for 10 minutes at 105^0C shows three spots at Rf. 0.12, 0.59 and 0.70 (all violet).Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Jali, Jazibe khoon, Muqabbie-Badan, Muqabbie-Bah and Mudire Baul.

Muhall-e- Istamalat (Therapeutic uses): Amraze Jild, Zofe Bah and Ehtabasul Baul**.**

Meqdar-e-Khorak (Dose): 3-5 gm

Side effects/ adverse effects: Burning sensation, skin irritation and excess use may harmful for dry temperamental person.

Important formulations: Raughane Sarshaf; Anqaruyae Kabir; Sufoof Khardal.

SATAWAR

(Tuberous root)

Asparagus racemosus (satavar, shatavari, or shatamull, shatawari) is a species of asparagus common throughout Nepal, Sri Lanka, India and the Himalayas. It grows 1–2 m (3 ft 3 in–6 ft 7 in) tall and prefers to take root in gravelly, rocky soils high up in piedmont plains, at 1,300–1,400 m (4,300–4,600 ft) elevation. It was botanically described in 1799. Because of its multiple uses, the demand for *Asparagus racemosus* is constantly on the rise. Because of destructive harvesting, combined with habitat destruction, and deforestation, the plant is now considered "endangered" in its natural habitat. Extracts made from dried roots are used for various reproductive and hormonal issues in women. It is also used in cases of gastric ulcers and indigestion. Few studies exist to support health effects of shatavari.[4] Studies of its effects on lactation have shown mixed results. Its safety has not been well studied, however small trials have found no adverse effects in mothers or their babies. The key pharmacologic constituents of shatavari are steriodal saponins, mucilage, and alkaloids.

Other names:

a. Botanical Name: Asparagus racemosus Willd

b. Family: Liliaceae

c. Bengali Name: Satamuli

d. English Name: Asparagus

Description

a. General: The drug Satawar consists of tuberous roots ofAsparagus racemosus Willd belongs to Family-Liliaceae, an ascending, spinous much branched perennial climber found throughout the country.

Fig: No: :*Asparagus racemosus*(Tuberous root)

b. Macroscopic**:**Root tuberous, 10- to 30 cm in length and 0.1 to 0.5 cm thick, tapering at both ends with longitudinal wrinkles color cream ; taste-sweetish.

c. Microscopic**:** Shows an outer layer of piliferous cells, ruptured at places, composed of small, thin-walled, rectangular asymmetrical cells, a number of cells elongated to form unicellular root hair s; cortex comprises of 25 to 29 layers, distinct in two zones; outer and inner cortex; outer cortex consists of 6 to 7 layers, compactly arranged, irregular to polygonal, thick walled, lignified cells, inner cortex comprises of 21 to 23 layers, oval to polygonal, thin walled , tangentially elongated cells with intercellular spaces, stone cells, either singly or in groups, form a discontinuous to continuous ring in the upper part of this region; raphides of calcium oxalate also present in this region; 2 to 3 layers of stone cells encircle the endodermis, endodermis composed of thin walled parenchymatous cells, pericycle present below endodermis; stele ex arch and radial in position; xylem consists of vessels, tracheids and parenchyma; xylem vessels have pitted thickening; phloem patches consists of usual elements ; pith composed of circular to oval parenchymatous cells, a few cells slightly lignified.

d. Powder**:**Yellowish-cream, fragments of lignified, thick walled cells; vessels with simple pits , pieces of raphids, numerous, lignified, rectangular elongated stone cells having clear triations with wide as well as narrow lumen and gropus of parenchyma.

Parts used: Tuberous Root

Habitat: Bangladesh, Nepal, Sri Lanka, India and the Himalayas.

Chemical Constituents: Sugar, Glycosides, Saponins and Sitosterol.

Afa'al-e-Adviya (Pharmacological activities):

Gastrointestinal effects: The powdered dried roots of Asparagus racemosus promote gastric emptying in healthy volunteers and its action comparable with that of the synthetic dopamine antagonist metoclopramide (Dalvi et al., 1990).It has been reported that A. racemosus along with Terminalia chebulaprotect gastric mucosa against pentagastrin and carbachol induced ulcers, by significantly reducing both severity of ulceration and ulcer index (Dahanukar et al., 1983). Shatavari is primarily known to ease the pain and burning sensation as well as other dyspeptic symptoms due to the ulcers. Since it does not have any antacids or anti-secretory properties, the observed mild acid secretion can be ascribable to the changes in gastric mucosa (Singh et al., 1983).

Galactagogue effect: Alcoholic extract of Asparagus racemosus have a significant effect on lactating mother to increase milk production and have been observed along with increased growth of the mammary gland alveolar tissue and acini. The growth of lobuloavelar tissue and milk secretion in the estrogenic primed rats was thought to be due to the action of released corticoids or prolactin (Amit Chawla et al., 2011).The galactagogue effect has also been studied in buffalo as described by Patel et al., (Patel et al., 1969). As described by Akansha Singh et al., the effect was evaluated in 60 lactating mothers by measuring the change in the prolactin hormone level. The study shows that the oral administration of A. racemosus led to thrice increase the level of prolactin than that of the control group.

Immunomodulatory activities: The use of Asparagus racemosus dried root powder modulates the action of the immune system. That in turn, decreases the inflammatory response. It induces the immune system to fight against immune deficiencies (like AIDS), infections and cancer. It may be helpful in obtaining higher protective antibody against different vaccinations including more effective cell mediated immune response for protection against various bacterial, viral, and other diseases. Several workers has studied the effect of Asparagus racemosus root extract in augmentation of humoral and cell mediated immune response providing better protection level against infections (Akansha Singh et al., 2014).

Anticancer activity: Natural products have long been used for treatment against cancer. There are at least 10000 species of plants, documented to have anti-cancerous properties. As described by Shankar et.al the isolated shatavarin IV along with AR-2B containing 5.05% shatavarin IV showed potent cytotoxicity. It showed increase in non-viable cell count when compared to untreated mice of group in the study (Chitme et al., 2009)

Antidiabetic effect: Diabetes mellitus (DM) is a major reason of disability and hospitalization that parents a substantial burden on companies worldwide. In such circumstances, herbal medicines for the treatment of diabetes become significant. Asparagus racemosus roots have been reported to reduce blood glucose level in rats, and rabbits. Asparagus racemosus root extract causes a wide ranging stimulatory effect on physiological insulinotropic pathways (Fuller et al., 1983).

Antioxidant action: Antioxidants are the moieties which are involved in the prevention of cell damage, common pathway for many diseases. As given by Aarati K the Methanolic extract of the root possess significant anti-oxidant properties when administered through the oral method. The levels of enzymes like superoxidase dismutase, catalase and ascorbic acid increase with significant reduction in the lipid peroxidation. The antioxidant properties were mainly exhibited due to the presence of Isoflavons (Wiboonpun et al., 2004).

Antiulcer effect: Ulcer is one of the burning problems in developing and even developed countries. It is induced due to imbalance among aggressive factors, especially gastric acid and pepsin, and protecting factors including gastric mucosa, bicarbonate and prostaglandin.

Mizaj (Temperament): Cold $1^0$and Moist1^0

Musleh (Corrective): Unknown

Badal (Proximal substitute): Bujidana.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 5 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 0.5 percent, Appendix 2.2.4.

Alcohol soluble extractives: Not less than 10 percent, Appendix 2.2.6.

Water soluble extractives: Not less than 45 percent, Appendix 2.2.7.

TLC: TLC of alcoholic extract on silica gel "G plate" using n-Butanol: Acetic Acid: Water (4:1:5) v/v shows on the exposure to iodine vapour three spots appear at Rf 0.07, 0.50 and 0.67(all yellow). On spraying with 5% methanolic-Sulphuric acid reagent and heating the plate for 10 minutes at 110^0C shows four spots at Rf. 0.07 (black), 0.41 (grey), 0.50 and 0.83 (both brownish yellow). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Mugharri (Agglutinant); Muqabbie bah (Aphrodisiac); Mughalliz e Mani (Inspissant to Semen); Muqabbie Rehem (uterine Tonic).

Muhall-e- Istamalat (Therapeutic uses): Ishal (Diarrhoea); Jiryan (Spermatorrhoea); Kasrate Ehtelam (Excessive Nocturnal Emission ;); Sailanur Rehem (leucorrhoea); Surat e inzal (Premature ejaculation) and Zaheer (Dysentry)

Meqdar-e-Khorak (Dose):5-7 gm

Side effects/ adverse effects: Dyspepsia; nausea and vomiting.

Important formulations: Suffof e Sailanur Rehem; Sufoof e Salab.Qurse Niswan.Habbe Asgand. Suffof Asparagus; Tablet Asparagus; Capsule Asparagus and Syrup Asparagus.

SAZAJ HINDI

(Stem Bark)

This drug Sazaj hindi is a dried stem bark of *Cinnamomum tamala*, a medium sized evergreen tree, about 2-10 m tall.

Other names:

a) Botanical name: *Cinriamomiim tatnala* (Buch. Ham.) Nees and Eberm.

b) Family: Lauraceae

c) Bengali name: Tejpata, Tejpatra

d) English name: Indian cassia

Description:

a) General: Its leaves are staked, opposite, or sub opposite, elliptic-oblong, nerved from the base, shining, leathery, entire, long pointed, new leaves are slightly pinkish tinged, flowers are small, yellowish and blooming in the month of march to may. It grows throughout Bangladesh but cultivated more in southern region as spice as well as for medicinal value. Also this plant grows wild in the tropical and subtropical Himalayas.

b) Macroscopic: Bark is flat or slightly curved: 2 to 11.0 cm in length, 1 to 2.0 cm inwidth, 0.3 to 1.2 cm thick, hard, outer surface rough, dark brown, having patches of cork; inner surface brown, smooth with some depression at places; fracture short odour less aromatic than C. *zeylanicum* and C. *cassia;* taste sweet with a warm sensation.

c) Microscopic:**:** Transverse section of the bark shows about 7 to 10 layers of cork; cells arecompactly arranged, thick-walled, rectangular and reddish-brown; epidermis obliterated; cork followed by a large zone of cortical; the outer three or four layers of cells are suberized where the outer most layer cells have thickened outer walls: the inner cortex consists of irregularly arranged and generally tangentially elongated parenchyma cells; primary phloem cells not distinct; at places sclerenchyma cells show uniformly thickened walls; sclereids are widely distributed singly or in small group of various sizes and shapes, of about 15 to 81µ in length and 12 to 42 µ in width with ramified pits and narrow lumen; almost uniformly thickened or in dome, U-shaped; phloem fibers numerous, measuring about 390 to 550 µ in length and 30 to 32 µ in width at the middle; pointed ends, heavily thickened, aseptate, lumen narrow; medulary ray consists of roughly radially elongated parenchyma cells; acicular crystals of calcium oxalate measure about 5 to 8 µ. in length; spherical starch grain is of about 6 to 10 µ in diameter; at places oil cells and oil droplets are frequently present.
Thefragments of the bark in surface view show numerous cork-tissue; cells are rectangular, thick-walled, suberized and reddish-brown.

Powder : Brown, fragrant, less aromatic than C. zeylamicum or c. cassia,taste sweet andhot; shows sclereids of various sizes; oil cells, starch grains, acicular crystals, abundant oil droplets, cork- tissue and fibers of variable length are present.

Parts used: Leave, Steam bark

Habitat: It grows throughout Bangladesh but cultivated more in southern region as spice as well as
for medicinal value. Also this plant grows wild in the tropical and subtropical Himalayas.

Phytoconstituents: Essential oil and Diterpines

Af'aal-e-Adviya (Pharmacological Activities):

Some of Af'aal-e-Adviya (Pharmacological Activities) are described here.

Antidiabetic activity: Methanol and successive water extract of bark of Cinnamomum tamala was screened by using a-amylase inhibition assay for antidiabetic activity. The percentage inhibition values of bark of the *Cinnamomum tamala* were found to be 97.49% and 93.78% respectively. Similarly, IC50 values of methanol and successive water extract of the *Cinnamomum tamala* were 1.80 and 5.53 respectively. The methanol extract showed high potent activity than successive water extract of Cinnamomum tamala.

Antibacterial activity:*Cinnamomum tamala* stem-bark extracts revealed a good antibacterial activity. Some earlier researches carried out on the other species of Cinnamomum were also in concordance with our results22. Stem-bark extracts of Cinnamomum tamala were evaluated for in vitro antibacterial potential by agar well diffusion assay. The essential oil from the bark of Cinnamomum zeylanicum showed in vitro antimicrobial activity against several microorganisms.

Antimicrobial activity: Volatile oil was found to be 100% active against Fusarium moniliforme, Aspergillus niger, A. oryzae and A. solani but not for A. awamori in inverted patri-plate method, though food poisoned method revealed 100% activity for A. niger and Fusarium moniliforme at 6µl dose. It was found to be highly effective in controlling the growth of A. flavus, A. solani and A. oryzae.

Mizaj (Temperament): Hot 3", Dry 2'^

Musleeh (Corrective): Mustagi

Badal (Proximal substitute): Qirfa

Identity, purity and strength:

Foreign Matter	-	Not more than 2%,	Appendix 2.2.2.
Total Ash	-	Not more than 5%,	Appendix 2.2.3.
Acid insoluble ash	-	Not more than 3%,	Appendix 2.2.4.
Alcohol-soluble extractives-		Not less than 22%,	Appendix 2.2.6.
Water-soluble extractives	-	Not less than 5%,	Appendix 2.2.7

TLC behavior of ethanolic extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Petroleum ether: Diethyl ether: Ethyl Acetate:(80:18: 2)	On spraying plate with Vaniline H_2S0_4 and heated for 5 minutes at 105^o	3	0.26 0.48 0.60

Aa'maal-e-Adviya (Pharmacological Action):

Muqavvi-e-dimagh, Mufarreh-e-Qalb, Muqavvi-e-Qalb, Muqavvi-e-medah, Kaasir-e-Riyah, Moharrik,Mudir-e-baol, Mushtahi,Mudir-e-Haiz, Qatel-e-jaraseem, Ma'ny Zeyabetus.

Mahall-e-Istemalat (Therapeutic use):

Sual. Nafkh-e-Shikam, Soo-e-Hazm, Khafqan, Wajaul Qalb, Yarqan, Zeyabetus, Tayaf'fuun

Meqdar-e-Khorak (Dose): 3 - 5 g

Side-effects / Adverse-effects: No significant side effects / Adverse-effectshave been observed.

Important formulations:

Dawa-ul-Misk Motadil, Dawa-ul-Misk Motadil Jawahar Wali, Dawa-ul-Kurkum Kabir, Dawa-ul-Kurkum Saghir, Halwa-e- Chobchini.

SEER

(Bulb)

Allium sativum is a species in the onion genus *Allium*. It is native to Central Asia and northeastern Iran and has long been a common seasoning worldwide, with a history of several thousand years of human consumption and use.

Other names:

a. Botanical/Scientific Name: *Allium sativum Linn*

b. Family: Liliaceae

c. Bengali/ Ayurvedic Name: Rashun

d. English Name: Garlic

Description

a. General**:** The drug Seer (Rashun) consists of bulb of Allium sativum belongs to family Liliaceae, a perennial bulbous plant, cultivated as an important condiment crop in the country.

Fig: No. 12 : Rasun Bulb

b. Macroscopic**:** Drugs occurs as entire bulb or isolated cloves (bulblets); bulb sub-globular, 4-6 cm in diameter, consisting of 8-20 cloves, surrounded by 3-5 whitish papery membranous scales attached to a short, disc like woody stem having numerous, wiry

rootlets on the underside; each cloveis irregularly ovoid, tapering at upper end with dorsal convex surface 2-3 cm long, 0.5: 0.8 cm wide, each surrounded by two very thin papery whitish and brittle scales having 2-3 yellowish green folded leaves contained within two white fleshy, modified leaf bases or scales; odor peculiarly pungent and disagreeable; taste-acrid gives warmth to the tongue.

c. Microscopic**:** A clove of bulb shows trit o tetrangular appearance in outline; outer scale consists of an outer epidermis, followed by hypodermal crystal layer, mesophyll made of parenchyma cells and an inner epidermis both outer and inner epidermis consist of sub-rectangular cells, hypodermis consists of compressed, irregular, tangentially elongated cells, each cell having large prismatic crystals of calcium oxalate, while many cells contain small prismatic crystals also. Mesophyll several layers of parenchymatous cells having a few vascular tissues with spiral vessels; inner epidermis similar to outer one, inner scale similar to outer scale but outer epidermis composed of sclerenchymatous cells, prismatic crystals in hypodermis slightly smaller.

In surface view cells of outer epidermis is elongated, narrow with thin porous wall while those of inner epidermis similar to outer one but non-porous; cells of hypodermal crystals layer ellipsoidal with thick porous walls, each cell having large prismatic crystals of calcium oxalate, many cells also contain small prismatic crystals, in addition to bigger ones, inner scale shows markedly sclerenchymatous with greatly thickened walls and very narrow lumen; cells of hypodermal crystal layers some smaller with walls more frequently pitted, size of crystals also smaller.

Parts used: Bulb

Habitat: Bangladesh and India

Chemical Constituents: Volatile oil containing Allyl Disulphide and Diallyl Disulphide. It also contains Allin, Allicin, Mucilage and Albumin.

Afa'al-e-Adviya (Pharmacological activities):

Antibacterial activity: Louis Pasteur (1858) and Lehmann (1930) provided the first modern scientific evidences for medicinal and antibacterial use of garlic extract. Garlic has been observed to possess antiviral, antibacterial and antifungal activities (Konaklieva & Plotkin, 2006).

Cavallito & Bailey (1944) had demonstrated that garlic juice diluted to one part in 125,000 inhibits the bacterial growth of Staphylococcus, Streptococcus, Vibrio (including *V. cholerae)* and Bacillus (including *Bacillus typhosus, B. dysenteriae and B. enteritidis*).

Johnson & Vaughn (1969) reported that 10 % extract of dehydrated garlic bulb demonstrated antibactericidal action against *Salmonella typhimurium* and *Escherichia coli* within 2 to 6 h exposure. Crude extract of garlic has proven to be quite effective against both gram-negative and gram-positive bacteria.

Al-Waili Saloom et al. (2007) investigated that heating, storage and ultraviolet exposure of fresh garlic juice significantly inhibited its antimicrobial activity against common human pathogens.

Hughes & Lawson (1991) observed allicin, methyl allylthiosulfinates and allylmethylsulfinates, constituents in aqueous garlic clove and powder homogenate, had in vitro antibacterial activities while polar compound alliin did not. Allicin and allyl-methyl plus methyl-allyl thiosulfinate have shown inhibition of the in vitro growth of Helicobacter pylori, the bacterium responsible for serious gastric diseases as ulcer and even gastric cancer (Canizares et al., 2004a,b).

Sasaki & Kita (2003) reported the antibacterial activity of garlic powder against Bacillus anthracis. A 1% water solution of garlic powder in the test tube method killed B. anthracis within 3 h of treatment at room temperature.

Barki & Douglas (2005) and Groppo et al. (2007) observed that garlic extract inhibits the growth of oral pathogens and certain proteases and thus it may have therapeutic value, particularly for periodontitis.

Anti-fungal activity: Garlic extract has been demonstrated in 40 species of zoopathogenic fungi, retarding the growth in 8 of 15 genera tested (Appleton & Tansey, 1975; Shadkchan et al., 2004; Ledezma & Apitz-Castro, 2006). In a comparison of the fungistatic activity of garlic extract with nystatin, griseofulvin and amphotericin B, garlic had a broad-spectrum activity against 17 strains of fungi, including the dermatophytes, yeasts, Aspergillus and Penicillium. Garlic was more effective than nystatin in retarding growth of the fungi (Srivastava, 1984). Barone & Tansey (1977) and Yamada & Azuma (1977) demonstrated that allicin in aqueous extract of garlic bulbs was the major anticandida constituent. Aqueous extract of garlic is inhibitory and lethal to numerous strains of Cryptococcus neoformans

(Fromtling & Bulmer, 1978). In China, garlic is used frequently to treat fatal form of Cryptococcal meningitis (Abdullah et al., 1988). Singh & Singh (1997) observed that water extract of garlic inhibits the growth of certain fungi that can cause meningitis. An aqueous extract of garlic has been demonstrated to inhibit the growth of several zoopathogenic fungi such as Candida albicans, commonly involved in vaginitis.

Garlic and cardiovascular diseases: The medicinal effect of garlic and garlic extracts on cardiovascular diseases has been widely studied. Preparations of garlic and chemical constituents of garlic have been investigated for possible effects on cardiovascular diseases such as hyperlipidemia, hypertension, platelet aggregation and blood fibrinolytic activity (Kendler, 1987; Lawson et al., 1992; Isensee et al., 1993; Isaacsolin et al., 1998; Koscielny et al., 1999; Mantawy & Mahoud, 2002; Gardner et al., 2003; Siegel et al., 2004).

Hypocholesterolaemic activity: Most of the studies on the effects of garlic on blood lipids in patients with cardiovascular disorders have been carried out in India. Intake of high-fat meals causes a significant increase in serum triglyceride and cholesterol levels (Groot & Scheck, 1984). Observations suggest that use of garlic (and onion as well) prevents the hypercholesterolemia induced by high-fat meal (Jain & Andleigh, 1969; Bordia & Bansal, 1973; Sainani et al., 1979; Mirhadi & Singh, 1991; Elkayam et al., 2003). Augusti (1977) and Bhushan et al. (1979) reported that eating of 10 g fresh garlic per day for 2 months significantly decreases (15%-28.5%) serum cholesterol levels among hypercholesterolemic patient. Sainani et al. (1979) compared vegetarians, with different eating habits with regards to the use of onions and garlic. Group I consumed onion and garlic in liberal amounts (50 g garlic and 600 g onion per week); Group II consumed small amount of onion and garlic (10 g garlic and 200 g onion per week), and Group III totally abstained from the use of garlic and onion. The level of cholesterol, triglyceride, phospholipid and ß- lipoproteins were the lowest in the individuals consuming liberal amounts of garlic and onion. These results indicate that routine consumption of onion and garlic in the diet has a beneficial effect in maintaining the serum lipids at low or normal levels

Hypotensive activity: High blood pressure is one of the major risk factors of atherosclerosis (Srivastava et al., 1995). The hypotensive effect of garlic was recognized by Loeper & Debray (1921). Damrau (1941) gave two Allimin tablets containing 4.75 g of garlic concentrate (equivalent to about 0.31 g of desiccated garlic and 2.375 g of desiccated parsley) to 26 hypertensive patients three times daily for three days. Blood pressure reduction was

observed in 85% of the patients: the average decline in systolic and diastolic blood pressure was 12.3 mm Hg and 6.5 mm Hg, respectively. He also reported that headache was relieved in 14 of the 17 patients complaining of the symptom, and dizziness was cured in 12 of 13 patients and improvement was observed in remaining patient

Antiplatelet aggregation activity: More recent literature suggests possible beneficial effects of garlic and its extract in preventing atherosclerotic disease. Reuter et al. (1974) and Lutomski (1987) demonstrated that adenosine, a compound in high concentration (0.056%) in garlic, inhibits aggregation of platelet and improves blood flow in the coronary vessels. Investigations have shown that garlic oil could inhibit platelet aggregation (Mohammad et al., 1980; Mohammad & Woodward, 1986; Srivastava & Justesen, 1989) and ether extract of garlic juice taken with a fatty diet could decrease cholesterol and fibrinogen and increase. Srivastava & Mustafa (1993) reported that several mechanisms are involved in garlic-induced inhibition of platelet aggregation. These effects are the modification of platelet membrane properties, inhibition of calcium mobilization, and inhibition of several steps of the arachidonic acid cascade in platelets. In fact, a direct inhibitory effect of garlic extracts and its components on the enzymes of the arachidonic acid cascade have been reported (Srivastava, 1984; Srivastava & Justesen, 1989; Makheja & Bailey, 1990; Wagner et al., 1991). Day et al. (1976) reported that several biochemical agents such as adenosine diphosphate (ADP), collagen, epinephrine, arachidonate and especially thromboxane-A elevate platelet aggregation. Bordia et al. (1978) observed that garlic caused a dose dependent inhibition of platelet aggregation induced by ADP, epinephrine and collagen. Both aqueous and organic extracts of garlic inhibit platelet aggregation induced by arachidonic acid, ADP, adrenaline, collagen, calcium ionophore A23187 and thrombin (Apitz-castro et al., 1983; Srivastava, 1984; Srivastava & Justesen, 1989)

Allicin is permeability through phospholipid membranes may contribute to its biological activity. Allicin (diallyl thiosulfinate) is the main biologically active component of the freshly crushed garlic extracts.

Mizaj (Temperament): Hot 3^0 and Dry 3^0

Musleh (Corrective): Katira/Dhone/ ground nut oil.

Badal (Proximal substitute): Onion.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 4 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 1 percent, Appendix 2.2.4.
Alcohol soluble extractives	: Not less than 2.5percent, Appendix 2.2.6.
Water soluble extractive	: Not less than 60percent, Appendix 2.2.7.
Volatile oil	: Not less than 0.1percent, Appendix 2.2.8.

TLC: TLC of alcoholic extract on silica gel "G plate" using n-Butanol: Isopropanol: Acetic acid: Water (3:1:1:1) shows under UV (366 nm) two fluorescent zones at Rf 0.58 and 0.72 (both light blue). On the exposure to iodine vapour nine spots appear at Rf 0.18, 0.26,0.34, 0.38, 0.46, 0.58,0.72,0.77 and 0.93 (all yellow). On spraying with ninhydrin reagent and heating the plate for 10 minutes 110^0C seven spot spots appear at Rf. 0.26, 0.38, 0.46, 0.58, 0.67, 0.72 and 0.93 9(all pink). On spraying with Vanillin-Sulphuric acid reagent and heating the plate for 10 minutes at 110^0C shows seven spots at Rf. 0.26, 0.38, 0.46, 0.58, 0.67, 0.72 and 0.93 (all grey). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Externally-Jali, Mohalili and Muqarreh; Internally- Muqabbie Meda, Musakkine Alam, Muqabbie Bah, Mudire Baul wa Haiz, Muqatte Akhlate Ghaliza.

Muhall-e- Istamalat (Therapeutic uses): Wajaul Mafasil, Bars, Bahaq, Falij, Laqwa, Rasha, Sual, Dama and Humma.

Meqdar-e-Khorak (Dose): 2-3 gm

Side effects/ adverse effects: Headache, GI disturbance and Irritation.

Important formulations: Majoon Seer and Raughan e Sheer. Arq Lahsun. Kurse Garlitab.Capsule Garlic

SEHJANA

(Leaf)

Moringa oleifera is a fast-growing, drought-resistant tree. It is native to tropical and subtropical regions of South Asia. It is widely cultivated for its young seed pods and leaves used as vegetables and for traditional herbal medicine. The immature seed pods, called "drumsticks", are commonly consumed in South Asia. They are prepared by parboiling, and cooked in a curry until soft. The seed pods/fruits, even when cooked by boiling, remain particularly high in vitamin C (which may be degraded variably by cooking) and are also a good source of dietary fiber, potassium, magnesium, and manganese.

Other names:

a. Botanical Name: *Moringa oleifera /Moringa pterygosperm*

b. Family: Moringaceae

c. Bengali Name: Sajina

d. English Name: Drumstick tree/ Horse Radish Tree

Description

a. General:The drug Sehjana consists of dried of *Moringa oleifera /Moringa pterygosperm*belongs to Family Moringaceae, a small or medium sized tree, found with in Sub-Himalayan tract, commonly cultivated throughout the country.

Fig: No.13 : Sajina Leaf

b. Macroscopic**:** Leaves tripinnate compound , available in the form of leaflet and some broken pieces rachis, slender thickened and articulated at the base, leaflet 1.2-2 cm long and 0.5 -1 cm wide; entire elliptic ovate and obovate, rounded and narrowed at base and obtuse at apex; smooth and greenish-grey pale green; odour and taste not distinct.

c. Microscopic**:**Rachis: Rachis shows single layered epidermis, followed by single layer of pigmented, collenchymatous, hypodermis, cortex consisting of 5-10 layered, oval to elliptical, thin walled, parenchymatous cells; pericycle forming a broken ring, consisting of pericyclic fibers; vascular bundle collateral; pith composed of wide zone of thin walled, parenchymatous cells, rosette crystals of calcium oxalate present in cortex, pith and phloem parenchyma.

Leaflet: Leaflet shows dorsiventral structure, epidermis and unicellular hairs present on both the surfaces; palisable single layered, spongy parenchyma 2-3 layers, central region occupied by a crescent shaped collateral vascular bundle surrounded by 2-4 layers of collenchymatous cells; rosette crystals of calcium oxalate present in mesophyll and collenchymatous cells; stomata anomocytic, present on both surface but more on lower surface and 290-350 lower surface per mm square; vein islets number 50-65.

d. Powder**:** Greyish-green shows groups of spongy parenchym, palisade cells, spiral vessels, unicellular hairs with blunt tip; pieces of polyhydral epidermal cells in surface view, stomata and rosette crystals of calcium oxalate.

Parts used: Leaf

Habitat: Tropical and subtropical regions of South Asia likes Bangladesh and India

Chemical Constituents: The chemical constituents of the methanolic extract of Moringa oleifera leaves and seeds were investigated using Gas chromatography-mass spectrometry. Sixteen chemical constituents were identified in the leaf methanolic extract; they are 9-octadecenoic acid (20.89%), L-(+)-ascorbic acid- 2,6- dihexadecanoate(19.66%), 14–methyl-8-hexadecenal (8.11%), 4- hydroxyl-4-methyl-2-pentanone (7.01%), 3-ethyl-2, 4-dimethylpentane (6.14%), phytol (4.24%), octadecamethyl-cyclononasiloxane (1.23%), 1, 2-benzene dicarboxylic acid (2.46%), 3, 4-epoxyethanone comprising (1.78%), N-(-1-methylethyllidene)-benzene ethanamine (1.54%), 4, 8, 12, 16-tetramethylheptadecan-4-olide (2.77%), 3-5-bis (1, 1-dimethylethyl)-phenol (2.55%), 1-hexadecanol (1.23%), 3, 7, 11, 15-tetramethyl-2 hexadecene-1-ol (1.17%), hexadecanoic acid (2.03%) and 1, 2, 3-propanetriyl

ester-9 octadecenoic acid(1.23%). Five chemical constituents were identified in methanolic seed extract and they are oleic acid (84%), L-(+) - ascorbic acid- 2, 6-dihexadecanoate (9.80%), 9-octadecenoic acid (1.88%), methyl ester-hexadecanoic acid (1.31%) and 9-octadecenamide (0.78%).

Afa'al-e-Adviya (Pharmacological activities):

Antibacterial and Antifungal activity**:** A considerable reduction in the growth of test bacteria was observed by distillate of *M. oleifera* suggesting antibacterial effect. Among bacteria tested, more inhibition was observed in case of *E. coli* followed by *S. aureus, K. pneumoniae, P. aeruginosa and B. subtilis.*Inhibition of fungi was also observed as reduced colony diameter in plates poisoned with distillate as compared to control plates. More inhibition of *A. niger* was found followed by *A. oryzae, A. terreus and A. nidulans*. The antimicrobial activity and antifungal activities of steam distillate of *M. oleifera* might be possibly due to the essential oil fraction of the plant material present in the distillate fraction.

Anti-Oxidant activity**:** The antioxidant property of *Moringa* may be due to the presence of phenolic compounds that was confirmed by phytochemical screening of the hydro-ethanolic extract. In this respect, *Moringa* pods contain important bioactive compounds including glucosinolates, isothiocyanates, thiocarbamates, and flavonoids. These compounds quench ROS, chelate metal ions and regenerate membrane-bound antioxidants.β-carotene, the major component reported from the drumsticks of the plant and vitamin A and C present in *M. oleifera* serve as an explanation for their mode of action in the induction of antioxidant profiles in the present investigation. The biochemical basis of the chemopreventive potency of *M. oleifera*extract may be attributed to the synergistic action of the constituents of the extract and the induction of Phase-II enzymes (GSTs) and antioxidant enzymes, which might be implicated in the anticarcinogenic activity.

The aqueous extract of *Moringa oleifera* exhibited strong scavenging effect on 2, 2-diphenyl-2-picryl hydrazyl (DPPH) free radical, superoxide, nitric oxide radical and inhibition of lipid per oxidation. The free radical scavenging effect of *Moringa oleifera* leaf extract was comparable with that of the reference antioxidants. The extracts of *Moringa oleifera* both mature and tender leaves have potent antioxidant activity against free radicals, prevent oxidative damage to major biomolecules and afford significant protection against oxidative damage.

The *Moringa oleifera* hydro- alcoholic leaf extracts (1000 mg/kg) and *Moringa oleifera* aqueous pod (fruit) extract (750 mg/kg) contain high amount of tannin, phenolic

compounds and flavonoids. The poly phenolic constituents of this plant could be contributory to their ethano-medical use.

Gastric Ulcer Protective Activity: Das *et al*., studied the possible antiulcer effects of water extracts of *M. oleifera* in two animal models of ulcers. The water extract of leaves was tested for antiulcer activity at the dose level of 200 mg and 400 mg/kg p.o. in pyloric ligation and ibuprofen induced gastric ulcer models. The severity of gastric ulceration in both the models was assessed based on the means of ulcer index.

Both the models produced moderate to severe ulcers in control group of animals; in that the maximum was by pylorus ligation method. Both famotidine and the extract of *M. oleifera* significantly ($p<0.001$) reduced the ulcer index as compared to control group in both ulcer models. The antiulcer effect of *M. oleifera* was comparable with that of the standard drugs in pylorus ligation and ibuprofen induced ulcer methods. Famotidine and *M. oleifera* extract significantly ($p<0.05$) reduced the free acidity and total acidity of gastric juice. It is equally potent when compared to famotidine.

It was also found that the aqueous extract of *M. oleifera* leaf was shown to protect rats from developing gastric ulcer induced by indomethacin in a dose dependent manner. Tannins with its protein precipitating and vasoconstriction effect could be advantageous in preventing ulcer development [23]. Tannins being an astringent may have precipitated microproteins on the site of the ulcer thereby forming an impervious protective pellicle over the lining to prevent toxic substance and resist the attack of proteolytic enzyme. Presence of flavonoids has also been reported to offer some protection in ulcer development by increasing capillary resistance, and improve microcirculation which renders the cells less injurious to precipitating factors.

The leaf extract of the plant was found to protect the gastric mucosa against indomethacin effect in a dose dependent manner. Phytochemical constituent of the leaf extract of *M. oleifera* (tannins and flavonoids) that reduced initiation and perpetuation of ulceration may be responsible for the observed effects. The leaf extract thus has the potential of an antiulcerogenic agent, which suggest it's used in traditional medicine.

Analgesic Activity and Local Anaesthetic Activity**:** The analgesic activity of alcoholic extract of *M. oleifera* and its various fractions as Petroleum ether, Ethyl acetate, Diethyl ether, n-Butanol were carried out by using Hotplate and Tail immersion method. Amongst alcoholic extract and its various fractions of seeds of *M. oleifera* alcoholic extract showed potent analgesic activity which is comparable to that of aspirin at the dose of 25 mg/kg of body weight. From this study, it can be concluded that the seeds of *M. oleifera* Lam. possess marked analgesic activity and is equipotent to standard drug (Aspirin) which establishes the

use of *M. oleifera* seeds as regular analgesic [5]. The local anaesthetic activity of the methanol extract of *M. oleifera* was tested in frog and guinea pig models and it was seen that in both animals, the plant (root bark) has produced significant local anaesthetic activity.

Anti-Inflammatory and Antinociceptive Activity: The anti-inflammatory action of an aqueous extract of root in rats with weight between 120 and 160 g was investigated by Ndiaye *et al* [28]. At a dose of 750 mg/kg the *M. oleifera* treatment significantly inhibited the development of oedema at 1, 3 and 5 hours (reduction by 53.5, 44.6 and 51.1% respectively). Increasing the dose of *M. oleifera* to 1000 mg/kg did not increase the inhibitory effect on oedema development at 1 and 3 hours, whereas this dose potentiated the oedema at 5 hours.

Treatment with indomethacin significantly inhibited the development of oedema 1, 3 and 5 hours (49.1, 82.1 and 46.9% respectively). These findings indicate that an aqueous root extract of *M. oleifera* at 750 mg/kg reduces the carrageenan induced oedema to similar extent as the potent anti-inflammatory drug indomethacin. Moreover, these results provide further evidence that the roots of *M. oleifera* contain anti-inflammatory principle that may be useful in the treatment of the acute inflammatory conditions. Bioassay-guided isolation and purification of the ethyl acetate extract of *M. oleifera* fruits yielded three new phenolic glycosides; 4- [(2'- O- acetyl- alpha- l-rhamnosyloxy) benzyl] isothiocyanate (1), 4-[(3'-O-acetyl-alpha-l-rhamnosyloxy)benzyl] isothiocyanate (2), and S-methyl-N-{4-[(alpha-l-rhamnosyloxy) benzyl]} thiocarbamate (3), together with five known phenolic glycosides.

The anti-inflammatory activity of isolated compounds was investigated with the lipopolysaccharide (LPS)-induced murine macrophage RAW 264.7 cell line. It was found that 4-[(2'-O-acetyl-alpha-l-rhamnosyloxy)benzyl]isothiocyanate (1) possessed potent NO-inhibitory activity with an IC(50) value of 1.67 microM, followed by 2 (IC(50)=2.66 microM), 4 (IC(50)=2.71 microM), and 5 (IC(50)=14.4 microM), respectively. These isolated compounds 1, 2, 4 and 5 are responsible for the reported NO-inhibitory effect of *M. oleifera* fruits (Cheenpracha *et al*., 2010). *M. oleifera* may also possess some beneficial properties that act against chemically stimulated immune-mediated inflammatory responses that are characteristic of asthma in the rat.

Sulaiman et al. evaluated the antinociceptive and anti-inflammatory effects of the aqueous extract of the leaves of *M. oleifera* in laboratory animals, using the writhing, hot-plate and formalin tests as the antinociceptive assays, and carrageenan-induced paw oedema test as the anti-inflammatory assay. The extract (10, 30 and 100 mg/kg) exhibited significant ($P < 0.05$) antinociceptive activity, which occurred in a dose-dependent manner, in all tests used. The extract also exhibited significant ($P < 0.05$) anti-inflammatory activity in a dose dependent

manner. In conclusion, *M. oleifera* leaves possess peripherally non-opioid mediated and centrally opioid mediated anti- nociceptive and anti-inflammatory activities. This study also confirms the traditional uses of *M. oleifera* in the treatment of ailments, particularly those related to pain and inflammation

Cardioprotective Activity**:** Nandave *et al.*, evaluated cardioprotective effect of lyophilized hydroalcoholic extract of *M. oleifera* in the isoproterenol (ISP)-induced model of myocardial infarction. Chronic treatment with *M. oleifera* demonstrated mitigating effects on ISP-induced hemodynamic [HR, (+) LV dP/dt, (-) LV dP/dt, and LVEDP] perturbations. Chronic *M. oleifera* treatment resulted in significant favorable modulation of the biochemical enzymes (superoxide dismutase, catalase, glutathione peroxidase, lactate dehydro- genase, and creatine kinase-MB) but failed to demonstrate any significant effect on reduced glutathione compared to the ISP control group. *Moringa* treatment significantly prevented the rise in lipid peroxidation in myocardial tissue.

Furthermore, *M. oleifera* also prevented the deleterious histopathological and ultrastructural perturbations caused by ISP. Based on the results of the present study, it can be concluded that *M. oleifera* extract possesses significant cardioprotective effect, which may be attributed to its antioxidant, antiperoxidative, and myocardial preservative properties.

Wound Healing Activity: The aqueous extract of leaves of *M. oleifera* was investigated for its wound healing activity. The extract was studied at dose level of 300 mg/kg body weight using resutured incision, excision, and dead space wound models in rats. The prohealing actions seem to be due to increased collagen deposition as well as better alignment and maturation. From the study results obtained, it may be concluded that the aqueous extract of *M. oleifera* has significant wound healing property.

Hypotensive and Spasmolytic Activities: Bioassay directed fractionation of an ethanolic extract of *M. oleifera* leaves showing hypotensive activity led to the isolation of two nitrile glycosides, niazirin and niazirinin and three mustard oil glycosides, 4-[(4'-O-acetyl-alpha-L-rhamnosyloxy) benzyl] isothiocyanate, niaziminin A, and niaziminin B.

Isothiocyanate 4 and the thiocarbamate glycosides niaziminin A and B showed hypotensive activity while nitrile glycosides 1 and 2 were found to be inactive in this regard. Moreover, spasmolytic activity exhibited by the constituents of the plant provides a scientific basis for the traditional uses of the plant in gastrointestinal motility disorders.

Faizi *et al.*, also investigated the hypotensive activity of the ethanolic and aqueous extracts of *M. oleifera*whole pods and their parts, namely, coat, pulp, and seed. The activity of the ethanolic extract of both the pods and the seeds was equivalent at the dose of 30 mg/kg. It

was found that the ethyl acetate phase of the ethanolic extract of pods was found to be the most potent fraction at the same dose. Its bioassay-directed fractionation led to the isolation of thiocarbamate and isothiocyanate glycosides which were also the hypotensive principles of the pods as observed in case of *Moringa* leaves. Two new compounds, O-[2'-hydroxy-3'-(2''-heptenyloxy)]-propyl undecanoate (1) and O-ethyl-4-[(alpha-L-rhamnosyloxy)-benzyl] carbamate along with the known substances methyl p-hydroxybenzoate and beta-sitosterol have also been isolated in the present studies. The latter two compounds and p-hydroxybenzaldehyde showed promising hypotensive activity.

Anti-helmentic, Hypolipidaemic and Antiathero- sclerotic Activities: It was observed that the plant showed potent anthelmentic activity and caused paralysis within 6-15 min while death is comparable with that of piperazine citrate as death of worms was observed at 64 min . Chumark *et al*., investigated the hypolipidaemic and antiatherosclerotic activities of *M. oleifera* leaf extract. They found that in hypercholesterol-fed rabbits, at 12 weeks of treatment, the water extract of the plant significantly ($P<0.05$) lowered the cholesterol levels and reduced the atherosclerotic plaque formation to about 50% and 86%, respectively and these effects were at degrees comparable to those of simvastatin

The methanolic extract of *M. oleifera* (150, 300 and 600 mg/kg, p.o.) and simvastatin (4 mg/kg, p.o.) along with hyperlipidemic diet were administered to Albino Wistar rats for 30 days in order to observe hypolipidaemic effect. It was found that the serum cholesterol, triacylglyceride, VLDL, LDL, and atherogenic index were reduced by *M. oleifera* and simvastatin but HDL level was increased as compared to the corresponding high fed cholesterol diet group (control). *M. oleifera* was also found to increase the excretion of fecal cholesterol. Thus, it can be concluded that *M. oleifera* possesses a hypolipidemic effect

Antiurolithiatic Activity**:** The effect of oral administration of aqueous and alcoholic extract of *M. oleifera* root-wood on calcium oxalate urolithiasis has been studied in male Wistar albino rats. Ethylene glycol feeding resulted in hyperoxaluria as well as increased renal excretion of calcium and phosphate. Supplementation with aqueous and alcoholic extract of *M. oleifera* root-wood significantly reduced the elevated urinary oxalate, showing a regulatory action on endogenous oxalate synthesis. The increased deposition of stone forming constituents in the kidneys of calculogenic rats was also significantly lowered by curative and preventive treatment using aqueous and alcoholic extracts. Thus the results indicate that the root-wood of *M. oleifera* is endowed with antiurolithiatic activity.

Oleic acid is a fatty acid that occurs naturally in various animal and vegetable fats and oils. Oleic acid is found to have antibacterial activity, particularly in inhibiting the growth of several Gram-positive bacterial species.

Mizaj (Temperament): Hot 3^0 and Dry 3^0

Musleh (Corrective): Gol morich.

Badal (Proximal substitute): Fruits of Sajina.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 16 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 4 percent, Appendix 2.2.4.
Alcohol soluble extractive	: Not less than 8 percent, Appendix 2.2.6.
Water soluble extractive	: Not less than 22percent, Appendix 2.2.7.

TLC: TLC of alcoholic extract on silica gel "G plate" using Toluene: Ethylacetate (9:1) shows six spots at Rf 0.05, 0.18, 0.26 (all green), 0.36 (yellowish green), 0.46 (dark green) and 0.94 (yellow) in visible light. Under UV (366 nm) six fluorescent zones are visible at Rf 0.05, 0.18, 0.26, 0.36 and 0.46(all red) &0.94 (blue). On spraying with 5% methanolic phosphomolybdic acid reagent six spots appear on heating the plate for 10 minutes 105^0C at Rf. 0.05, 0.20, 0.26 (all green), , 0.30(pink), 0.36(green), 0.46 (green), 0.53 (yellow), 0.69 (yellow), 0.82 (yellow) and 0.94 (violet). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Qatile Kirme Amaa, Mushtahi and Mahallile Waram.

Muhall-e- Istamalat (Therapeutic uses): Wajaul Mafasil, Wajaul Qutu, Zofe Ishtaha and Wajaul Shikam

Meqdar-e-Khorak (Dose): 6-10 gm

Side effects/ adverse effects: Dizziness and abortion

Important formulations: Majune Muggaliz

SEMBHAL

(Stem bark)

Bombax ceiba is literally known as “cotton-tree flowers” in Cantonese. It plays a vital role in Southern Chinese, especially Cantonese, culture. *It* grows in an average of 20 meters, with old trees up to 60 meters in wet tropical regions. The trunk and limb bear numerous conical spines particularly when young, but get eroded when older. The leaves are palmate with about 6 leaflets radiating from a central point (tip of petiole), an average of 7~10 centimeters wide, 13~15 centimeters in length. The leaf's long flexible petiole is up to 20 cm long.

Other names:

a. Botanical Name: *Bombax ceiba Linn /Bombax malabaricun Schott &Endl.*

b. Family: Bombaceae

c. Bengali Name: Shimul

d. English Name: Silk cotton tree

Description

a. General**:**The drug Sembhal consists of the mature stem bark of *Bombax ceiba/Bombax malabaricum* belongs to Family Bombaceae, a deciduous tree attaining a height upto 40 m and a girth up to 6m or more and distributed throughout the hotter parts of the country upto 1500 m or more

Fig: No 14 : Shimul Stem Bark

b. Macroscopic:Bark 0.5-1 cm thick, pale ash to silvery grey externally brownish internally , external surface rough with vertical and transverse cracks, mucilaginous on chewing, fracture-fibrous.

c. Microscopic:Stem bark shows 10-15 layered, transversely, elongated, arranged, thin-walled, cork cells with a few outer layers having brown colored contents rhytidoma present at certain places interrupting the cork; secondary cortex consists of moderately thin walled, parenchymatous cells containing orange brown contents; stone cells in singles or in group, thin walled, ova to irregular and tangential bands of stone cells having striation with narrow lumen, measuring 13-33 micron in diameter occur throughout the secondary cortex; secondary phloem consists of usual elements traversed by phloem rays, elements in the outer region form tangential band of ceratenchyma, a number of concentric bands of fibers alternating with groups of sieve elements also present; fibers lingnified having narrow lumen and pointed tips; phloem rays numerous and wavy, 1-6 seriate cells being radially elongated and moderately thin walled rosette crystals of calcium oxalate scattered throughout the secondary cortex, phloem parenchyma and ray cells; mucilage canals and tannin cells present in the parenchymatous cells of cortex.

d. Powder**:** Reddish-brown; shows fragments of cork cells , parenchymatous cells single or groups of thin walled, oval to irregular, stone cells having striation with narrow lumen, measuring 13-33 micron in diameter rosette crystals of calcium oxalate, phloem fibers and numerous reddish-brown colored masses and tannin cells.

Parts used: Stem Bark

Habitat: Bangladesh, India and China.

Chemical Constituents: Flowers also contain β-D-glucoside of β- sitosterol, free β-sitosterol, hetriacontane, hetriacontanol, kaempferol, quercetin and traces of essential oil. 25 Ethyl acetate fractions of alcoholic extract of flower were investigated by GC-MS and 46 compounds were identified like palmitic acid, ethyl palmitate, βsitosterol etc. 26 2 unusual 9'- norneolignans i.e. bombasin and bombasin 4-o-β-glucoside and a novel Dgulono-γ-lactone derivative bombalin were isolated from flowers alongwith 3 known compounds. Dihydrodehydro di-coniferyl alcohol 4-o-β-d-glucopyranoside, trans-3- (p-coumaroyl) quinic acid and neochlorogenic acid and checked for HGC-27 gastrointestinal cancer cell line but all

were inactive. 27 Quercetagetin a novel glycoside was isolated from flowers. 28 2 new flavanoid compounds were isolated from petals of flowers and identified as pelargonidin-5-β-glucopyranoside and cyaniding-7-methyl ether- 3-β-glucopyranoside. 29 N- hexane extract of flower contain 14 compounds including cholesterol, stigmasterol, campesterol, α-amyrin and 10 were hydrocarbons. It has also saponins, tannins and gums.

Afa'al-e-Adviya (Pharmacological activities):

Anti-Inflammatory Activity: In-vitro anti-inflammatory activity of extracts of B. ceiba was assessed by Human Red Blood Corpuscles (HRBC) membrane stabilizing method with slight modifications. The blood was collected from healthy human volunteer who had not taken any antiinflammatory drugs for 2 weeks prior to the experiment and transferred to the heparinized centrifuge tubes and centrifuged at 3,000 rpm. The packed cells were washed with isosaline and a 10% suspension in normal saline was made. Diclofenac potassium (50 mcg/ml) was used as standard. The reaction mixture (4-5 ml) consisted 2 ml of hypotonic saline (0.25% w/v NaCl), 1 ml of 0.15 M phosphate buffer (pH 7.4), 1 ml of test solution (1000 mcg/ml) in normal saline and 0.5 ml of 10% HRBC in normal saline. For control, 1 ml of isotonic saline was used instead of test solution. The mixtures were incubated at 56ºC for 30 min. and cooled at running tap water, centrifuge at 3000 rpm for 20 min. The absorbance of supernatant was read at 560 nm using visible Spectrophotometer. The experiment was performed in triplicates. The control represents 100% lyses.

Anti-obesity activity: The extract of stem bark of Bombax ceibaLinn.has significant anti-obesity potential against HFD induced experimental obesity, possibly due to modulation of FAS and PTP-1B signaling in Wistar rats due to the presence of active flavanoids and lupeol respectively.

Anti-diabetic activity: A dose of 600 mg/kg of B. ceiba extract is the most effective to cause significant ($p < 0.05$). The extract also increased significantly MF, IF and EF ($p < 0.05$). These effects were observed in sexually active and inactive male mice.

The antioxidant activity of a root extract of Bombax ceiba was evaluated using several antioxidant assays, in terms of its: ability to scavenge DPPH and reducing power assay. Methanolic extract of the roots showed high amount of phenolics (30.95% w/w) and tannins (15.45% w/w) and a very good DPPH radical scavenging activity in a dose dependent manner.

In-vitro anti-inflammatory activity of extracts of Bombax ceiba was assessed by human red blood corpuscles membrane stabilizing method with slight modifications.

Mizaj (Temperament): Hot 1^0 and Dry 1^0

Musleh (Corrective): Unknown

Badal (Proximal substitute): No proximal substitute was found.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 13 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 2 percent, Appendix 2.2.4.
Alcohol soluble extractive	: Not less than 2 percent, Appendix 2.2.6.
Water soluble extract	: Not less than 7 percent, Appendix 2.2.7.

TLC: TLC of the ethanolic extract on silica gel "G plate" using Toluene: ethyl acetate (9:1) shows under UV (366 nm) one fluorescent zone at Rf 0.59 (blue). On exposure to iodine vapour four spots appear at Rf0.11,0.44, 0.59 and 0.92 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate for 10 minutes at 110^0C three spots appear at Rf. 0.44, 0.59 and 0.92 (all violet). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Muhallile Warm; Dafe Jaryan

Muhall-e- Istamalat (Therapeutic uses): Jaryan and Auram

Meqdar-e-Khorak (Dose): 5-10 gm

Side effects/ adverse effects: No adverse effects were notified

Important formulations: Kurse Deedan

TAMAR HINDI

(Fruit pulp)

Tamarind (*Tamarindus indica*) is a leguminous tree (family Fabaceae) bearing edible fruit that is indigenous to tropical Africa. The genus *Tamarindus* is monotypic, meaning that it contains only this species. The tamarind tree produces pod-like fruit that contains a brown, edible pulp used in cuisines around the world. The pulp is also used in traditional medicine.

Other names:

a. Botanical Name: *Tamarindus indica* Linn

b. Family: Caesalpinaceae

c. Bengali Name: Tetul

d. English Name: Tamarind Tree

Description

a. General:The drug Tamar Hindi consists of fruit pulp without seeds of*Tamarindus indica* Linn belongs to Family, a moderate sized to large evergreen tree upto 24 m in height and 7 m in girth, cultivated throughout India or self-sown in waste places and in forest lands also planted as a venue trees.

Fig: No. 31: Tamarind plant and fruit pulp.

b. Macroscopic:Fruit pulp occurs as a reddish-brown, moist, sticky mass, in which yellowish brown fibers are readily seen; odour pleasant and taste sweetish and acidic.

c. Microscopic:Fruit pulp consists of thin walled, elongated to polygonal, parenchymatous cells of considerable size, traversed by a number of long fibro-vascular bundles and having a very few small starch granules and numerous prismatic crystals of calcium oxalate.

Parts used: Fruit pulp

Habitat: Bangladesh and India

Chemical Constituents: It contain high levels of crude protein with many essential amino acids, carbohydrate, d-tartaric acid, l-malic acid, polyphenolics, flavonoids, pectin, methyl salicylate, safrole, ionones, cinnamaldehyde, and ethyl cinnamate minerals, potassium, phosphorus, calcium and magnesium

Afa'al-e-Adviya (Pharmacological activities)*:T. indica* has a broad spectrum of antibacterial activity. The methanolic leaf extract of *T. indica* was assessed for antibacterial activity against *Burkholderia pseudomallei*, and its name *in vitro* inhibitory potential suggests further animal studies to understand the role of *T. indica* in treating melioidosis. Methanol and acetone extracts of *T. indica* have showed significant antimicrobial activity against *Klebsiella pneumoniae* the antibacterial activity was done by agar disk diffusion method. The activity was compared with standard antimicrobials *Amikacin and Piperacillin*. The antimicrobial activity of the concentrated extracts (aqueous, ethonolic, acetone extract) were evaluated by determination of the diameter of zone of inhibition against both gram-negative and gram-positive bacteria and fungi using the paper disk diffusion method. These have potent antimicrobial activity against *Salmonella paratyphi, Bacillus subtilis, Salmonella typhi,* and *Staphylococcus aureus*. Other studies have suggested that *T. indica* has shown potential antimicrobial activity; and that petroleum ether, water, ethanol extract of *T. indica* ripe fruit were evaluated for possible antibacterial activity against gram-positive and gram-negative species,methonolic and aqueous extract of 30 medicinal plants and *T. indica* flower have shown anti-microbial activity. The methanolic extracts of 14 species showed antibacterial activities during this preliminary screening. The result showed that the extract from *T. indica* possesses strong *in vitro*antibacterial activity against the bacteria tested.

Mizaj (Temperament): Hot $2^0$and Moist 2^0

Musleh (Corrective): Banafsa and Unnab

Badal (Proximal substitute) : Alu Bukhara.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 4 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 0.5 percent, Appendix 2.2.4.
Alcohol soluble extractives	: Not less than 46 percent, Appendix 2.2.6.
Water soluble extractives	: Not less than 59 percent, Appendix 2.2.7.

TLC: TLC of alcoholic extract on silica gel "G plate" using n-Butanol: Acetic Acid: water (5:1:4) shows under UV (366 nm) two spots at Rf 0.27 and 0.46 (both yellowish blue). On the exposure to iodine five spots appear at Rf 0.27, 0.46, 0.57, 0.65 0.59 and 0.87 (all yellow). On spraying with 5% Methanolic- Sulphuric acid reagent and heating the plate for 10 minutes at 105^0C shows five spots at Rf. 0.46, 0.57, 0.65, 0.71 and 0.87 (all grey). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Mushel e safra (Bile purgative) and Musakkin (Sedative)

Muhall-e- Istamalat (Therapeutic uses): Atash e Mufrit (Polydipsia); Ghasiyan (Nausea) and Qai (vomiting)

Meqdar-e-Khorak (Dose):4-10 grams

Side effects/ adverse effects: Cough, fever and intussusception

Important formulations: Jawarish e Tamar Hind and Sikanjabeen e Tamar

Hindi.Syrup Tamarhind.

TAMBOL

(Leaf)

The betel (*Piper betle*) is a vine belonging to the Piperaceae family, which includes pepper and kava. Betel leaf is mostly consumed in Asia, and elsewhere in the world by some Asian emigrants, as betel *quid* or in paan, with Areca nut and/or tobacco.

In India and Sri Lanka, a sheaf of betel leaves is traditionally offered as a mark of respect and auspicious beginnings. Occasions include greeting elders at wedding ceremonies, celebrating the New Year, and offering payment to Ayurvedic physicians and astrologers (to whom money and/or areca nut, placed on top of the sheaf of leaves, are offered in thanks for blessings).

The betel plant is an evergreen perennial, with glossy heart-shaped leaves and white catkin. The betel plant originated in South and South East Asia.

Other names:

a. Botanical Name: *Piper betle* Linn

b. Family: Piperaceae

c. Bengali Name: Pan

d. English Name: Betel leaf

Description

a. General**:** The drug Tambol consists of leaf of *Piper betle* Linn belongs to Piperaceae, a deciduous perennial creeper, climbing by many short adventitious rootlets. It is widely cultivated in hotter and damper parts of India and Bangladesh.

Fig No:32 : Betel leaf

b. Macroscopic**:** Leaf varies greatly in size, 7.5-20 cm, ovate cordate, entire, glabrous, apex acuminate to acute, lamina membranous, upper surface deep green and lower surface lighter in color, primary or sub-primary nerves usually 7, sometimes 5-9; odor-aromatic; taste-tightly pungent.

c. Microscopic**:**Petiole-Single layered epidermis composed of cubical to slightly tangentially elongated cells covered with thick, striated cuticle; epidermal cells elongate to form uni to bicellular, occasionally multicellular hairs; epidermis followed by a discontinuous collenchymatous zone in the form of arcs, and a multilayered parenchymatous zone; vascular bundles arranged in the arcs, phloem surrounds xylem; vascular bundles usually of two sizes larger ones 7 in number and smaller ones 2 in number.

Midrib-epidermis single layered, composed of colorless cubical cells, covered with a wavy cuticle; epidermis followed by 2-3 layers of irregular colorless cells of hypodermis and a few layers of collenchyma, towards lower side collenchyma multilayered, vascular bundle shows phloem surrounding xylem; lower epidermis single layered and covered with wavy cuticle; some epidermal cells elongate to form unit to bi-cellular occasionally multicellular hairs.

Lamina-shows dorsi ventral structure; epidermis single layered, tangentially elongated covered with thick striated cuticle on both sides; hypodermis 2-3 layered having chloroplasts occasionally with secretory cells, mesophyll differentiated into palisade and spongy parenchyma. Palisade single layered spongy parenchyma 3-4 layered composed of irregularly round cells, a few secretory cells also present in this region; hairs a few uni to bicellular; occasionally multicellular all being uniseriate present on both surfaces; stomata anisocytic palisade ratio not over 4; stomatal index 11-13; vein islet number 2-7.

d. Powder**:**Greyish green; shows polygonal epidermal cells in surface view, simple pitted vessels and a few uni to tricellular hairs, anisocytic types of stomata, palisade and spongy parenchyma cells and simple pitted vessels.

Parts used: Leaf

Habitat: India, Sri Lanka and Bangladesh

Chemical Constituents: Essential oil, Amino acids, vitamins and enzymes.

Afa'al-e-Adviya (Pharmacological activities):

Antimicrobial Activity: Nair and Chanda (2008), were studied the Aqueous and methanol extract of the leaves of *Terminalia catappa* L., *Manilkara zapota* L. and *Piper betel* L., for antibacterial activity against 10 Gram positive, 12 Gram negative bacteria and one fungal strain, *Candida tropicalis*. Piperacillin and gentamicin were used as standards for antibacterial assay, while fluconazole was used as standard for antifungal assay. The three plants showed different degree of activity against the microorganisms investigated. The methanolic extract was considerably more effective than aqueous extract in inhibiting the investigated microbial strains. The most active antimicrobial plant was *Piper betel*

Antihistaminic activity: Hajare *et al*., (2011), were evaluated Piper betel Linn. leaves for its antihistaminic activity. In the study, the pharmacological evaluation of ethanolic extract and essential oil extract of leaves of *P. betel* Linn. has been done for their antihistaminic activity on guinea pig. In isolated guinea pig tracheal chain preparation, there was a right side shift of dose response curve (DRC) of histamine. Chlor-pheniramine maleate was used as a standard drug.

Moreover extracts of *P. betel* disturbed histamine aerosol induce bronchoconstriction in whole guinea pig, where essential oil was more effective comparatively to ethanolic extract. Thus, they concluded that ethanolic extract and essential oil of P. betel Linn possess antihistaminic activity

Anti-inflammatory effects: The betel leaf is used as a common household remedy for inflammation in the oral cavity. Dohi *et al*., (1989), has shown that the ethanolic extract of betel leaf has been reported to possess anti-inflammatory activities at non-toxic concentrations in the complete Freund's adjuvant-induced model of arthritis in rats. Eugenol, one of the principal constituent of betel leaf has also been shown to possess anti-inflammatory effects in various animal models of studies with various inflamogens.

Antioxidant effects: Azuine *et al*., (1991) and Bhide *et al*., (1991) described that the betel leaf constituent's eugenol, hydroxychavicol and alpha-tocopherol were also shown to enhance the levels of GSH in mouse skin and liver. Together all these observations clearly indicated that the betel leaf extracts and some of its constituents increased the cellular antioxidants and mediate the chemopreventive effects at least in part.

Lei *et al.*, (2003) have shown that the aqueous extract of the inflorescence of Piper betel extract was effective in scavenging H_2O_2, superoxide radical and hydroxyl radical. The extract also prevented the hydroxyl. Radical-induced DNA strand breaks in the PUC18 plasmid . Rathee *et al*., (2006) have shown that the ethanol extracts of Bangla, sweet, and Mysore varieties of betel leaf were effective in scavenging DPPH radicals in vitro, with best effects being observed with the Bangla variety.

Recently, Manigauha *et al*., (2009) observed that the methanolic extracts of the betel leaves possess reducing power, DPPH radical, superoxide anion scavenging and deoxyribose degradation activities. Studies have also shown that the hydroalcoholic extract of the betel leaf possess nitrogen oxide scavenging effect *in vitro*.

Antimutagenic effects:Multiple studies have shown that the betel leaf is devoid of mutagenic activities in both prokaryotic and eukaryotic assay system [18, 19, 20] and also to possess antimutagenic (Shirname *et al*., 1983) and anticlastogenic effects (Bhattacharya *et al*., 2005). In vitro studies with cultured cells have shown that betel leaves did not cause any morphological transformation of the hamster embryo cells or induce sister chromatid exchanges in both virally transformed cells and PHA-stimulated human lymphocytes. Additionally, the ethanolic extract of betel leaf is also reported to possess γ-ray induced clastogenesis in plasmids.

Anti - haemolytic activity: Anti-haemolytic activity was studied by Chakraborty *et al*., (2011), using erythrocytes model piper betel leaf extracts and the extent of lipid peroxidation of the same was also determined The erythrocyte membranes are susceptible to peroxidation because they are rich in polyunsaturated fatty acids. They contain haemoglobin, which may catalyze the oxidation as they are continuously exposed to high concentration of oxygen. The oxidation of erythrocytes serves as good models for the oxidative damage of biological membranes. It has been found that certain chemicals, having ability to generate radicals attack the erythrocyte membrane, inducing the chain oxidations of lipids and proteins and eventually causing membrane damage leading to haemolysis. When red blood cells were treated with betel leaf extract along with H_2O_2 marked reduction in haemolysis was found .

Antiulcer Activity: Vyawahare *et al.*, (2010), evaluated the antiulcer activity of hydroalcoholic extract of *Piper betel* (HEPB) leaves, in rats employing the HCl-ethanol, acute stress and pylorusligation models to induce the experimental gastric ulcers. Pre-treatment with *Piper betel* extract provided significant ulcer protective effect in all the experimental models along with significant increase in gastric pH and decrease in gastric fluid volume. The hydroalcoholic extract of *Piper betel* leaves possesses antiulcer activity which can be attributed to its putative mechanism of action.

Antibacterial activity: The four varieties of *Piper betel*; namely Desawari, Desi, Bangladeshi and Jaleswar, cultivated in India. Agarwal *et al*., (2012) evaluated that the cold aqueous, methanolic, ethanolic, and ethyl acetate extracts of dried leaves of all the four varieties of *Piper betel* at a final concentration of 500 mg/ml were tested against pathogenic microorganisms such as *Pseudomonas aeruginosa, Staphylococcus aureus* and *Escherichia coli* using agar well diffusion method.

Antifungal activity: Ali *et al*., (2010) have shown that the Hydroxychavicol, isolated from the chloroform extraction of the aqueous leaf extract of *Piper betel* L., (Piperaceae) was investigated for its antifungal activity against 124 strains of selected fungi. Hydroxychavicol exhibited inhibitory effect on fungal species of clinical significance, with the MICs ranging from 15.62 to 500 μg/ml for yeasts, 125 to 500 μg/ml for Aspergillus species, and 7.81 to 62.5 μg/ml for dermatophytes whereas the MFCs were found to be similar or two fold greater than the MICs. There was concentration-dependent killing of *Candida albicans* and *Candida glabrata* up to 8 × MIC. Hydroxychavicol also exhibited an extended post antifungal effect of 6.25 to 8.70 h at 4 × MIC for Candida species and suppressed the emergence of mutants of the fungal species tested at 2 × to 8 × MIC concentration. Their conclusion was that antifungal activity exhibited by this compound can be used as an antifungal agent particularly for treating topical infections, as well as gargle mouthwash against oral Candida infections.

Anti-diabetic activities: Arambewela *et al*., (2005) investigated the antidiabetic activity of *Piper betel* leaves, tested in normoglycaemic and strepozotocin (STZ)-induced diabetic rats using oral administration of hot water extract (HWE) and cold ethanolic extract (CEE). In normoglycaemic rats, both HWE and CEE significantly lowered the blood glucose level in a dose-dependent manner. In glucose tolerance test, both extracts markedly reduced the external glucose load. The antidiabetic activity of HWE is comparable to that of CEE. Both extracts were found to be non-toxic and well tolerated after following chronic oral administration (no overt signs of toxicity, hepatotoxicity or renotoxicity). However, the

weight of the spleen had increased in treated groups possibly indicating lympho-proliferative activity .

Palpebral skin antiseptic: The antiseptic effectiveness was measured by Amalia *et al*., (2009), counting the microbial colonies before and after administration of the antiseptic solutions.

This study demonstrates that the mean colony counts after application of 20% *Piper betel* leaf infusion showed a significant reduction of 27-100% compared with those before administration (p=0.001). Mean colony counts after 10% povidone-iodine administration showed a significant reduction of 88-100% compared with the mean counts before the solution was applied (p=0.000). The 20% *Piper betel* infusion has an antiseptic potential

Local anaesthetics action: Krishnakumar *et al*., (2001), have shown that, extracts of plain betel leaf with betel nut, with and without autoclaving, were tested for surface and infiltration anesthetic activities using rabbits and Guianese pigs. The results were compared with normal saline control and xylocaine drug control. Betel leaf showed dose-dependent infiltration anesthetic activity comparable with xylocaine. As a surface anesthetic, the onset was as quick as xylocaine and the duration was shorter than xylocaine. Betel nut significantly reduced the infiltration activity and abolished the surface anesthetic activity of betel leaf. Autoclaving did not result in any loss of activity. Betel leaf has potent local anesthetic action both by surface and infiltration techniques. This effect is reduced by the addition of betel nut but not lost on autoclaving .

Role of betel leaf extract on thyroid function: Panda and Kar (1998) demonstrated that the effects of betel leaf extract (0.10, 0.40, 0.80 and 2.0 g kg−1day−1for 15 days) on the alterations in thyroid hormone concentrations, lipid peroxidation (LPO) and on the activities of superoxide dismutase (SOD) and catalase (CAT) were investigated in male Swiss mice. Administration of betel leaf extract exhibited a dual role, depending on the different doses. While the lowest dose decreased thyroxine (T4) and increased serum triiodothyronine (T3) concentrations, reverse effects were observed at two higher doses.

Higher doses also increased LPO with a concomitant decrease in SOD and CAT activities. However, with the lowest dose most of these effects were reversed. Their findings suggested that betel leaf can be both stimulatory and inhibitory to thyroid function, particularly for T3generation and lipid peroxidation in male mice, depending on the amount consumed

Anti-nociceptive Activities: Arambewela *et al*., (2005), examined the antinociceptive activity of hot water extract (HWE) and cold ethanol extract (GEE) of *P. betel* leaves using rats and three models of nociception (tail flick, hot plate, and fonnalin tests). Different concentrations of H WE (125, 200, 300, 500mg/kg) and CEE (125, 200, 300, 500mg/kg) were made and

orally administrated to rats, and the reaction times were determined. Their results showed that the extracts have marked antinociceptive activity when evaluated in the hot plate and the formalin tests but not in the tail-flick test. The overall antinociceptive effect of CEE was higher than that of HWE.

As contraceptive: Singh *et al*., (2011), studied the mitochondrial activity of sperm, after treating semen with different concentrations of *Piper betel*. The mitochondrial activity was also evaluated after subjecting the semen samples for different incubation time periods. Test was done on more than 75% motile normozoospermic semen sample and was found that as the concentration of extracts increases the mitochondrial activity decreases significantly ($p < 0.001$), similar results were observed when constant concentration of extracts with increasing time intervals.

The mitochondrial activity decreases significantly ($p < 0.001$) in 5 minutes to 20 minutes incubation time. They concluded that Piper betel has properties to decrease mitochondrial activity in human sperm and ability to work as contraceptive

Mizaj (Temperament): Hot 2^0 and Dry2^0

Musleh (Corrective): choto elach, khoyer and Supari**.**

Badal (Proximal substitute): Lobong

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 17 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 3 percent, Appendix 2.2.4.
Alcohol soluble extractives	: Not less than 10 percent, Appendix 2.2.6.
Water soluble extractives	: Not less than 20 percent, Appendix 2.2.7.

TLC: TLC of alcoholic extract on silica gel "G plate" using Toluene: Ethyl acetate (9:1) shows in visible light five spots at Rf. O.11 (green), 0.18 (high green), 0.23 (yellow), 0.34 (grey) and 0.61 (greenish green). Under UV (366 nm) sevenfluorescent zones at Rf 0.11, 0.16 (both pink), 0.23 (brown), 0.34 (pink); 0.43 (pink), 0.61 (pink) and 0.76 (grey). On the exposure to iodine vapour seven spots appear at Rf 0.08nd 0.88 (all yellow). On spraying

with Vanillin-Sulphuric acid reagent and heating the plate for 10 minutes at 110^0C shows seven spots at Rf. 0.08, 0.11, 0.18 (all the three greenish grey), 0.34 (grey), 0.43 (violet), 0.61 and 0.76 (both light green). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Muqabbie Dimagh (Brain tonic); Muqabbie Hafiza (memory tonic); Mufarreh (Exhilarant); Mukharizze Loab e Dahan (Sialogague); Mualide Dam (Haematogenic); Muqabbie Qalb (Cardiac Tonic); Muqabbie Lissa (Gumtonic); Muqabbie Asnan (Strengthening teeth); Mukharizze Balgham (Expectorant); Mohallile Waram (Anti-inflammatory) and Jali.

Muhall-e- Istamalat (Therapeutic uses): Sual (cough); Zeequn Nafas (Asthma); Bohot us Saut (Hoarseness of voice); Wajaul Asnan (Odontalgia); Amraze Qalb (Cardiac diseases); Faqrud Dam (Anaemia).

Meqdar-e-Khorak (Dose): 1 leaf daily.

Side effects/ adverse effects: It may be harmful for hot temperamental person in empty stomach.

Important formulations: Habbe Pan; Habbe Kattha; Jawarish e Utraj; Arq Juzam; Habbe Nishat.Kurse Infuza

TALMAKHANA

(Seed)

This drug is a dried seed of *Asteracantha longifolia* Nees. Syn. *Hygrophila spinosa* T. Andres. (Acanthaceae). It is a spiny, stout, annual herb, common in water logged places.

Other names:

a) Botanical name: *Asteracantha longifolia* Nees. Syn. *Hygrophila spinosa* T. Andres.

b) Family:Acanthaceae

c) Bengali name: Talmakhna, Bhikshu, Shrigali, Pushpa /Ikshura, Ikshugandha and Kokilasha

d) English name**:** Hygrophila

Description:

a) General: It is a spiny, stout, annual herb, common in water logged places. It is a small plant growing to a height of 3-5 feet with small thorns or hairy parts all over the plant. The stem resembles to that of sugarcane. Leaves subsessile, oblong-lanceloate or linear lanceolate, spines yellowish brown, 2-3 cm long, Flower yellowish brown, fruit two celled, linear oblong, compressed about 8 cm long, pointed, 4-8 seeded. The flowers of the plant are of purple color. The seeds are black in color, ovate, flat or compressed, 0.2-0.25 cm long and 0.1-0.15 cm wide, hairy but appearing smooth; when soaked in water immediately get coated with mucilage, light brown: taste slightly bitter and odour not distinct. Flowers and the fruits are seen in the month of September to November.

b) Macroscopic: The Seed issmall, brown. 4.0 to 6.0 mm long and 2.5 to 3.5 mm wide, much flattened and truncated at the base, ovate-cordate in appearance, smooth when dry; if soaked in water and examined immediately under low power, adpressed trichomes start spreading and radiate all around the seeds except at the truncated part.

c) Microscopic: The seed shows a single layered epidermis; covered with a thin cuticle; bunch of unicellular trichomes are arising from epidermal cells where mucilaginous substance is produced; each trichome measures over a mm in length, pointed at the apex and consisting of annular thickenings; epidermis is followed by 1 or 2 layers of almost tangentially elongated parenchymatous cells where the innermost cells are crushed; disintegrated endosperm consist of oval to polygonal, thin-walled, parenchymatous cells with oil globules.

When seen in surface view the fragments of the epidermis of testa are composed of rectangular to polygonal prenchymatous cells; cell walls are slightly thickened. The mucilaginous trichomes which are abundant form mat like covering and remain attached to the epidermis of the seed.

Powder: Brown, odour, spicy, shows mucilaginous unicellular, uniseriate, trichomes with annular thickenings, fragments of embryo, numerous parenchyma cells and oil globules.

Parts used:

The whole plant, roots, seeds, and ashes of the plant, are extensively used in the system of medicine for various ailments.

Habitat: The plant is found near water source, fields and marshy land.

Phytoconstituents:

Seeds contain mucilage, potassium salts, diastase, lipase, protease, sterols, alkaloids, fixed oils, fatty acids and minerals like Ca, Mg, K, Fe, Cu, Zn, Mn, Co & Cr.

Af'aal-e-Adviya (Pharmacological Activities):

Some of Af'aal-e-Adviya (Pharmacological Activities) are described here.

Hepatoprotective activity: Methanolic extracts of the seeds show hepatoprotective activity against paracetamol and thioacetamide intoxification in rats (Singh & Handa, 1999). Ahmed et al. (2001) studied the seeds against chemically induced hepatocarcinogensis in Wistar rats. Methanol extract of seed showing antitumor promoting potential inhibit hepatocarcinogenesis in Wistar rats, increase GPx and CAT, ODC. Shivashangari et al. (2004) studied the protective efficacy of *A. longifolia* on acetaminophen-induced liver damage in rats. Shanmugasundaram & Venkataraman (2006) studied the aqueous extract of the roots for hepatoprotective in CCl4-induced liver toxicity in rats and in vitro antioxidant activity using ferric thiocyanate (FTC) and thiobarbituric acid (TBA) methods. Shailajan et al. (2005) showed the whole plant slurry of *A. longifolia* was hepatoprotective activity against CCl4 induced liver dysfunction in rats. Later they also reported that the slurry, aqueous extract and ethanolic extract of whole plant powder showed hepatoprotective effect against galactosamine induced hepatotoxicity (Shailajan et al. (2007).

Antitumor: Methanol extract of seed shows inhibition of hepatocarcinogenesis in Wistar rats.Increase GPx and CAT, ODC (Ahmed et al., 2001). Petroleum ether extract from *A. longifolia* root exhibited antitumor activity in Ehrlich ascites carcinoma and Sarcoma-180 bearing mice. Extract suppressed significantly the tumor fluid volume at the end of three weeks experiment. It decreased about 50% of packed cell volume and increased life span of EAC/S-180 bearing mice in a day dependent manner. It also repressed the rapid increase of bodyweight of tumor bearing mice (Mazumdar et al., 1997). *Hygrophila spinosa* hydroalcoholic extract of aerial part could prevent or delay the development of breast cancer in the rats (Pattanayak & Sunita, 2008).

Aphrodisiac activity: The ethanolic extract of seeds shows androgenic as well as improvement of sexual behaviour of rat in dose dependent manner, it also improve the histoarchitecture of testis and increase the concentration of sperm count in epididymis and also increase testosterone level (Chauhan et al., 2009, 2010).

Miscellaneous activity: Decoction of the whole plant and aqueous extract of ashes of *H. spinosa* showed diuretic action in rats, which was attributed to presence of potassium salts in high concentration. Diuretic activity of *A. longifolia* is attributed to lupeol. Lupeol also controls arthritis and acts as chemopreventive and immunomodulatory. Lupeol and b-sitosterol are having antipyretic, hepatoprotective, antioxidant, anticancerand macrofilaricidal activities. The plant is having anti-convulsant, antineoplastic, hepatoprotective, antifungal,

antispasmodic, antiinflammatory, diuretic, moderate antipyretic, hypotensive, vasodilatory, anabolic cum androgen like activity, bronchodilatory, antitumor promoting activity against chemically induced hepatocarcinogenesis in wistar rats.

Administration of *A. longifolia*, 8-10 gm (in divide doses) orally with milk or sugar for 3 months to fifty infertile couples with males suffering from oligospermia, necrospermia, less motile and unhealthy sperms showed appreciable change in viability after one month of treatment, including some change in morphological character of the sperm. In the 2nd month the semen analysis showed considerable improvement in number and motility and immaturity reduced. After three months of treatment normospermia developed in 80% of patients. Methanolic extract of the seeds of *H. auriculata* showed potent inhibitory action against leukotriene B4 biosynthesis in isolated bovine polymorphonulear leukocytes. Ethanol and distilled water extract of the plant exhibited significant anti-inflammatory activity, whereas significant analgesic activity was shown by petroleum ether and ethanol extract, when compared with respective controls and were comparable with those of standard drugs diclofenac sodium and analgin in albino rats and mice at a dose of 400 mg/kg body weight, orally.

Mizaj (Temperament): Cold 2^{o}- Moist 2^{o}

Musleeh (Corrective): Not require.

Badal (Proximal substitute): Satawer, Salab, Tudri

Identity, purity and strength:

Foreign Matter	-	Not more than 2%,	Appendix 2.2.2.
Total Ash	-	Not more than 25%,	Appendix 2.2.3.
Alcohol-soluble extractives	-	Not less than 7%,	Appendix 2.2.4.
Water-soluble extractives	-	Not less than 6%,	Appendix 2.2.6

TLC behavior of ethanolic extract:

Solvent system	*Spray/reagent treatment*	*No. of spots*	*Rf value*
Chloroform : Methanol : Acetic acid : Water (85:2.5:3:0.5)	On spraying plate with Analdehyde H_2S0_4 and heated for 5 minutes at 110^o C	8	0.18, 0.21 0.35, 0.40 0.62, 0.67 0.75, 0.97

Aa'maal-e-Adviya (Pharmacological Action):

Mudirr-e- Baul, Muqawwi-e- Bah, Mughalliz-e-Mani, Mohafiz-e-Jiger, Mohallil, Mundamil.

Mahall-e-Istemalat (Therapeutic use):

Waj-ul-mafasil, Suzaak. Hasat-e- Kulliya, Hasat-e- Masana, Istisqa, Zof-e-Bah, Qellat-e-Madda'a Manweya, Nuq's-e-Kirm'e Mani.

Meqdar-e-Khorak (Dose): 5-10gm

Side-effects / Adverse-effects: No significant side effects / Adverse-effects have been observed.

Important formulations: Halwa-e-Supari Pak, Safoof-e- Beejband, Safoof-e-Jiryan Khas, Safoof-e-Maghz-e-Kanwal Gatta

TUKHME GAJAR

(Seed)

The wild carrot is a herbaceous, somewhat variable biennial plant that grows between 30 and 60 cm (1 and 2 ft) tall, and is roughly hairy, with a stiff, solid stem. The leaves are tripinnate, finely divided and lacy, and overall triangular in shape. The leaves are bristly and alternate in a pinnate pattern that separates into thin segments. The flowers are small and dull white, clustered in flat, dense umbels. The umbels are terminal and approximately 3–4 inches (8–10 cm) wide. They may be pink in bud and may have a reddish or purple, flower in the centre of the umbel. The lower bracts are three-forked or pinnate, which distinguishes the plant from other white-flowered umbellifers. As the seedsdevelop, the umbel curls up at the edges, becomes more congested, and develops a concave surface. The fruits are oval and flattened, with short styles and hooked spines. The fruit is small, dry and bumpy with protective hairs surrounding it. The fruit of *Daucus carota* has two mericarp, or bicarpellate. The endosperm of the fruit grows before the embryo. The dried umbels detach from the plant, becoming tumbleweeds. The function of the tiny red flower, coloured by anthocyanin, is to attract insects. Wild carrot blooms in summer and fall. It thrives best in sun to partial shade. Daucus carota is commonly found along roadsides and in unused fields.

Similar in appearance to the deadly poison hemlock, *D. carota* is distinguished by a mix of tripinnate leaves, fine hairs on its solid green stems and on its leaves, a root that smells like carrots, and occasionally a single dark red flower in the center of the umbel.

Other names:

a. Botanical Name: *Daucus carota* Linn

b. Family: Apiaceae

c. Bengali Name: Gajor

d. English Name: Carrot

Description

a. General**:** The drug Tukhme Gajar consists of seed of*Daucus carota* Linn belongs to family-Apiaceae, a hispid much branched biennial plant indigenous to Kashmir, western himalya, Bangladesh. Now it is largely cultivated throughout the Bangladesh.

Fig: No:33: Carrot seed

b. Macroscopic**:** Fruit elliptic, terate, somewhat dorsally compressed, ridges all prominent , all ridges or the secondary only bristly, lateral primary ridges little developed, seed terate, dorsally sub compressed inner face plane, no characteristic odour and taste.

c. Microscopic: TS mericarp (fruit splits into two halves, each termed mericarp) shows flat surface called the commissural surface and rounded called the dorsal surface, four conspicuous secondary ridges and three inconspicuous primary ridges on the dorsal surface; two primary ridges on the commissural surface; vittae almost triangular in outline, four in the dorsal and two in the commissural surface, each below the secondary ridges (vittae run from the base of the mericarp to the apex near the stylopodium and its surface lined with parenchymatous epithelial cells, vittae elongated usually tapering at both end, multicellular, uniseriate filled with yellowish cellular contents and oil globules.

Epicarp consisting of single layer of tangentially elongated epidermal cells with thin cuticle with numerous unicellular trichomes; mesocarp consisting of 5 to 8 layers of thin walled, tangentially elongated parenchymatous cells, vascular bundle present below the primary ridges, vittae solitary, large almost triangular present in the secondary ridges, groups of thick walled sclerenchymatous present between the epicarp and vittae in the secondary ridges, endocarp consists of inner epidermal cells lignified, elongated and about five parallel rows,

endosperm consists of large polygonal thick walled cells containing numerous oil globules and other reserve food materials almost globular in shape, numerous micro-rosette of calcium oxalate crystals, thick walled pigmented (cells) layer present above the endosperm.

d. Powder**:** Cream, unicellular trichomes up to 300 micron; pigmented cells in surface view; vittae; mesocarpic parenchyma cells; endosperm cells in surface view with globular reserve food materials and micro rosette crystal, sclerenchyma fibers length up to 350 micron and breadth 20 micron; tracheids with pitted and spiral thickenings.

Parts used: Fruit

Habitat: Bangladesh and India

Chemical Constituents: The main fatty acids identified by gas chromatography were petroselinic (59.35%), linoleic (11, 82%), palmitic (10.01%) and stearic (2.41%) acids. Mineral contents (Al, Ca, Cu, Fe, K, Li, Mg, Mn, Na, Ni, P, Se, Sr, V and Zn) of seeds were also determined by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES). The seeds were found to be rich in protein, fiber and ash. The essential oil and edible oil compositions of carrot seeds from Konya were investigated by GC and GC-MS. The oil yields of essential and edible oil from carrot seeds were established as 0.83% and 7.84%, respectively. The major constituents of seed essential oil were carotol (66.78%), daucene (8.74) %, (Z,Z)-α-farnesene (5.86%), germacrene D (2.34%), trans-α-bergamotene (2.41%) and β-selinene (2.20%). Whereas, carotol (30.55%), daucol (12.60%) and copaenol (0.62%) were the important components of edible carrot seed oil. However, the dominant component of both oils was carotol.

Afa'al-e-Adviya (Pharmacological activities): The Daucus Carota seeds were collected and powdered in hand grinder and the methanolic extract were prepared. Phytochemical studies had been performed on the extract and TLC was performed by using chloroform + ethyl acetate (10:1 v/v). Dose of the extract was selected on the bases of previous work done on the Daucus carota seeds. Dose was calculated on the bases of acute toxicity studies.

Antioxidant and Hepatoprotective activities of the methanolic extract of Daucus carota seeds against Thioacetamide induced liver damaged rats were done after 7 days oral administration drug. On the next day blood was collected and animals were sacrificed and livers were removed immediately. The serum was separated from blood and serum enzyme like SGOT, SGPT, ALP and SOD, CAT, GRD, GPX, GST and LPO from the livers homogenate.

Hypolipidemic activity also was performed with Daucus carota seeds extract on the normal rats. Animals were treated with extract for 7 days and after seven days blood samples was collected and serum was separated. Lipid profile like Total cholesterol, triglyceride, HDL, LDL and VLDL was estimated by using biochemical kits.

The ethanolic extract of Daucus carota seeds (DCE) was administered orally in three doses (100, 200, 400 mg/kg) for seven successive days to different groups of young and aged mice. Elevated plus maze and passive avoidance apparatus served as the exteroceptive behavioral models for testing memory. Diazepam-, scopolamine- and ageing-induced amnesia served as the interoceptive behavioral models. DCE (200, 400 mg/kg, p.o.) showed significant improvement in memory scores of young and aged mice. The extent of memory improvement evoked by DCE was 23% at the dose of 200 mg/kg and 35% at the dose of 400 mg/kg in young mice using elevated plus maze. Similarly, significant improvements in memory scores were observed using passive avoidance apparatus and aged mice. Furthermore, DCE reversed the amnesia induced by scopolamine (0.4 mg/kg, i.p.) and diazepam (1 mg/kg, i.p.). Daucus carota extract (200, 400 mg/kg, p.o.) reduced significantly the brain acetylcholinesterase activity and cholesterol levels in young and aged mice. The extent of inhibition of brain cholinesterase activity evoked by DCE at the dose of 400 mg/kg was 22% in young and 19% in aged mice. There was a remarkable reduction in total cholesterol level as well, to the extent of 23% in young and 21% in aged animals with this dose of DCE. Therefore, DCE may prove to be a useful remedy for the management of cognitive dysfunctions on account of its multifarious beneficial effects such as, memory improving property, cholesterol lowering property and anticholinesterase activity.

Mizaj (Temperament): Hot 2^0 and Dry 2^0

Musleh (Corrective): Gorom Moshla

Badal (Proximal substitute): Mula and Shalgam**.**

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 7 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 0.2 percent, Appendix 2.2.4.

Alcohol soluble extractives : Not less than 22 percent, Appendix 2.2.6.

Water soluble extractive : Not less than 12 percent, Appendix 2.2.7.

Loss on drying : Not more than 8 percent, Appendix 2.2.9.

TLC: Extract 2 gm of sample with 20 ml of chloroform and alcholol under reflux on a water bath for 30 min. Filter and concentrated to 5 ml and carry out the thin layer of chromatography. Apply the chloroform extract on TLC plate. Develop the plate to a distance of 8.5 cm using Toluene: Ethyl acetate (5:1.5) as mobile phase. After development allow the plate to dry in air and examine under UV (254 nm). It shows major spot at Rf 0.15 (brownish). Under 366 nm it shows major spot at Rf 0.75 (light blue). Dip the plate in Vanillin-Sulphuric acid reagent followed by heating the plate for 10 minutes at 110^0C shows major spots at Rf. 0.95 (dark blue), 0.75(violet), 0.59b(blue) and 0.15 (Greenish violet).

Apply the alcohol extract on TLC plate. Develop the plate to a distance of 8.5 cm using Toluene: Ethyl acetate (5:1.5) as mobile phase. After development allow the plate to dry in air and examine under UV (366 nm). It shows major spot at Rf 0.72 (light blue) and 0.46 (reddish). Dip the plate in Vanillin-Sulphuric acid reagent followed by heating the plate for 10 minutes at 110^0C shows major spots at Rf. 0.78, 0.64, 0.57 (dark blue), 0.46 and 0.14 (violet). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Mudire Baul (Diuretic); Mudire Haiz (Emmenagogue), Musakkin (Sedative), Mufattitate hesat (Lithotriptic), Muqabbie Bah (Aphrodisiac), Muharrik (stimulant) and Kasir e riyah (carminative).

Muhall-e- Istamalat (Therapeutic uses): Ehtebase baul (Anuria); Ehtehase Haiz (Amenorrhoea); Zofe Bah (sexual debility), Wajaul sadar (chest pain), Sozish e baul (Burning micturition); Hasate kulliya wa Masana (Renal vesical calculus)

Meqdar-e-Khorak (Dose):2-5 grams.

Side effects/ adverse effects: Dyspepsia

Important formulations: Zawarishe jaruni sada, Habbe khabsul Hadid, Sharbate mudir, Luboobe Kabir and Luboob e barid.Dawaul Kurkum Kabir; Majoone salab Qurse Mubahhi.

TUKHME KASNI

(Seed)

Cichorium intybus, is a somewhat woody, perennialherbaceous plant of the dandelion family Asteraceae, usually with bright blue flowers, rarely white or pink. Many varieties are cultivated for salad leaves, chicons (blanched buds), or roots (var. *sativum*), which are baked, ground, and used as a coffee substitute and food additive. In the 21st century, inulin, an extract from chicory root, has been used in food manufacturing as a sweetenerand source of dietary fiber.

Other names:

a. Botanical Name: *Cichorium intybus* Linn

b. Family: Asteraceae

c. Bengali Name: Kasni Bij

d. English Name: Endive/ wild chicory.

Description

a. General: The drug consists of seed of *Cichorium intybus Linn belongs to family Asteraceae. It grows wild in Punjab, West Frontier Province, Hyderabad and Bangladesh. It is cultivated in different areas of Bangladesh.*

Fig: 34: Kashni plant and Seed

b. Macroscopic: The seed brown wedge shaped, gradually tapering towards base, 0.20-0.30 cm long ; 0.10-0.15 cm wide, roughly 4-5 ridged; pappus present, sepals five, thin, membranous; seed one; anatropous on basal placentation; dicotyledonous, ex-albuminous ; taste and odor indistinct.

c. Microscopic:TS of seed shows testa and cotyledons; testa has uniseriate parenchymatous etidermis; sclerenchymatous hypodermis and crushed inner epidermis; epidermis of cotyledons uniserite, parenchymatous, mesophyll composed of columnar cells filled with chloroplasts and oil globules.

d. Powder: Powder light brown, fine, freely floating on the surface of water; taste and odour indistinct; contains malphigian cells, columnar cells filled with chloroplasts and oil globules;

Parts used: Seed

Habitat: Europe, North America, China, and Australia

Chemical Constituents: Glycoside, lactucin and intybin

Afa'al-e-Adviya (Pharmacological activities): This plant has been known to posses Anti-ulcer, Hepatoprotective, Antibacterial, Cardioprotective, Antioxidant and Free radical Scavenging, Anti-malarial, Anti-fungal, Gastroprotective, Antihelminthic, Analgesics, Tumour protective, Anti-allergic and other miscellaneous activities. The whole plant contains a number of medicinally important compounds showing therapeutic effects such as inulin, esculin, volatile compounds, bitter sesquiterpene lactones, coumarins, flavonoids and vitamins etc. The pharmacological studies reported in the present review confirm the therapeutic value of *Chichorium Intybus L*. Thus the use of this plant for human and animal disease therapy and reinforce the importance of the ethno-botanical approach as a potential source of bioactive substances.

Mizaj (Temperament): Cold and Dry.

Musleh (Corrective): Banafsa and honey

Badal (Proximal substitute): Khubbazi and khetmi seed

Identity, purity and strength:

Foreign Matter : Not more than 2 percent, Appendix 2.2.2.

Total Ash	: Not more than 7 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 5 percent, Appendix 2.2.4.
Water soluble ash	: Not more than 4 percent, Appendix 2.2.5.
Alcohol soluble Ash	: Not less than 5 percent, Appendix 2.2.6.
Water soluble extractives	: Not less than 9 percent, Appendix 2.2.7.
Loss on drying (105^{o}c)	: Not more than 7 percent, Appendix 2.2.9.

TLC: Chloroform extract on silica gel "G plate" using Chloroform:Methanol (5:1) shows on the exposure to iodine vapour six spots appear at Rf 0.08, 0.20, 0.30. 0.41, 0.48 and 0.68. Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Mufatitte sudab (Deobstruent); Mudire Baul (Diuretic)

Muhall-e- Istamalat (Therapeutic uses): Yarkan Suddi (Obstructive jaundice); Warme Kabid (Hepatitis); Istisqa (Dropsy) and Hummiyate Muzmina (Chronic Fever).

Meqdar-e-Khorak (Dose):5-7 gm

Side effects/ adverse effects: Excess use may be harmful for cold temperamental people**.**

Important formulations: Arq Kasni and Sharbate Kasni.

TUKHME KHATMI

(Seed)

Althaea officinalis, or marsh-mallow, is a perennial species indigenous to Europe, Western Asia, and North Africa, which is used in herbalism and as an ornamental plant. A confection made from the root since ancient Egyptian times evolved into today's marshmallow treat,but most modern marshmallow treats no longer contain any marsh-mallow root.

Other names:

a. Botanical Name: *Althaea Officinalis* Linn

b. Family: Malvaceae

c. Bengali Name: Khatmi Bij

d. English Name: Marsh Mallow

Description

a. General**:** The drug Tukhm-e-khatmi consist of dried seeds of *Althaea Officinalis*Linn belongs to family-Malvaceae, a perennial, uniformly downy herb occurring in Kashmir region.

Fig: No 15: Tukhme Khetme plant and Seed

b. Macroscopic**:** The seeds are small to moderate size, approximately 6 mm, usually brownish-black, reniform, rugose, hairy at margin; become mucilaginous when soaked in water.

c. Microscopic: T.S shows testa, an outer multicellular layer comprising of outer most thick walled epidermis with multicellular, 2 to 6 armed stellate and some unicellular hairs, longest being near the micropyle, this is followed by 4 to 10 layers of parenchymatous cells several with rosette crystal of calcium oxalate, interrupted by achizogenous mucilage canals, the inner epidermis of testa is also thick walled. Tegmen two layered; outer tegmen 4 to 6 cells deep; lignified 2 to 6 armed stellate hairs present also on it, this easily detached from the inner tegmen; inner tegmen 4 to 6 cells deep, the outer being a row of palisade-like malphigian cells followed by a slight thick walled, non-lignified two layered hypodermis of cells with their inner periclinal walls concave; 2 to 3 layered parenchymatous mesophyll; the inner epidermis cells filled with starch grains which are polygonal to rounded ; 5 to 20 micro-meter in size, hilum circular or showing a 2 to 5 rayed cleft; lamellae indistinct; ovule campylotrophous; seeds of *Althaea rosea* do not show the type of hairs present in the *A. officinalis*, but heavy mostly unicellular hairs.

d. Powder: Powder brownish-black in color, odorless, mucilaginous and sweetish in taste; shows elongated thick walled ridged malphigian cells; in surface view, they are hexagonal showing wall thickenings, patches parenchyma with mucilage and starch grains, polygonal to rounded, 5 to 20 micro-meter, hilum circular or with a 2 to 5 rayed cleft; lamellae indistinct; rosette crystal of calcium oxalate and stellate hairs; a small amount of powder on microscopic slide turns marron with 50% H_2SO4 and black with 1N-NaOH in amylacetate. When treated with 1% ruthenium, red, powder becomes pink in color showing the presence of mucilage.

Parts used: Seed

Habitat: Asia, Europe and North Africa

Chemical Constituents: Glucose, sucrose & mannose, linoleic acid, isobutyl-alcohol, limonene, phellandrene, Gamma tolureldehyde, citral, terpeneol and beta sitosterol.

Afa'al-e-Adviya (Pharmacological activities):

In vitro and in vivo study of *A. officinalis* indicates significant pharmacological activity in the cough, irritation of the throat, gastric inflammation, anti-tumor, antiviral and immunostimulant.

α-Phellandrene is metabolized in sheep along at least two pathways. One of these entails reduction and oxidation to give phellandric and phellanduric acids, and the other

involves hydroxylation and glucuronide conjugation. Both *p*-cymene and carvotanacetone are found in the conjugate (Scheline 1991).

Mizaj (Temperament): Cold and Moist

Musleh (Corrective): Unknown

Badal (Proximal substitute): No proximal substitute was found.

Identity, purity and strength:

Foreign Matter	: Not more than 2 percent, Appendix 2.2.2.
Total Ash	: Not more than 8 percent, Appendix 2.2.3.
Acid-insoluble ash	: Not more than 1.5 percent, Appendix 2.2.4.
Alcohol soluble extractive	: Not less than 10 percent, Appendix 2.2.6.
Water soluble extractive	: Not less than 18 percent, Appendix 2.2.7.

TLC: TLC of methanolic extract on percoated silica gel "G plate"(0.2 mm thick) using Toluene: Ethyl acetate; methanol (85:14.5:0.5)shows under UV (366 nm) blue fluorescent at Rf 0.18, 0.33 and 0.67. On spraying with Anisaldehyde-Sulphuric acid reagent and heating the plate for 10 minutes at 120^0C shows spots at Rf. 0.10 (grey), 0.18(grey), 0.32 (green) 0.57 (greyish blue) and 0.67 (greyish-blue). Appendix 2.2.10.

Aa'a mal-e-Adviya (Pharmacological Action): Mohallil, Munaffise Balgham, Rade, Murakhhi and Munzij

Muhall-e- Istamalat (Therapeutic uses): Wajaul Mafasil, Zatul Janab, Zatul Raiyya, Nazla wa zukam and Sual.

Meqdar-e-Khorak (Dose): 5-7 gm

Side effects/ adverse effects: No adverse effect has been observed.

Important formulations: Laooq Khaskhas, Sharbate Zoofa, Sharbate Fariyad Rash. Tab let Marshmallow; Syrup Marshmallow; and Capsule Marshmallow.

Name of assigned expertsfor compilation of following Monographs

A . Dr. Shariq H. Khan		
MONOGRAPHS OF SINGLE DRUGS		
Sl. No.	Unani Name	Botanical Name
01.	Anisoon (Fruit)	*Pimpinellaanisum*Linn.
02.	Anjeer (Fruit)	*Ficuscarica* Linn.
03.	Aspaghol (Seed)	*Plantagoovata*Forsk.
04.	Azaraqi (Seed)	*Strychnosnux-vomica* Linn.
05.	Dhatura (Seed)	*Daturametel* Linn.
06.	Gul-e-Banafsha (Flower)	*Viola odorata* Linn.
07.	Gul-e-Madar (Flower)	*Calotropisprocera*Ait.
08.	Hanzal (Root)	*Citrulluscolocynthis*Schard.
09.	Hina (Leaf)	*Lawsoniainermis* Linn.
10.	Hulba (Seed)	*Trigonellafoenum-graecum* Linn.
11.	InderjaoShireen (Seed)	*Wrightiatinctoria*Roxb.
12.	Katai (Shoot)	*Solanumsurattense*Burm.
13.	Khulanjan (Rhizome)	*Alpiniagalanga* Linn.
14.	KunjadSiyah (Seed)	*Sesamumindicum* D.C.
15.	Neem (Leaf)	*Azadirachtaindica* A. Juss.
16.	Panwar (Seed)	*Cassia tora* Linn.
17.	Aftimoon (Whole plant)	*Cuscutareflexa*Roxb.
18.	Bakayin (Leaf)	*Meliaazedarach* Linn.
19.	Gul-e-Surkh (Flower)	*Rosa damascena* Mill.
20.	Mulsari (Flower)	*Mimusopselengi* Linn.
21.	Neem (Seed)	*Azadirachtaindica* A. Juss.
22.	Qirfa (Stem bark)	*Cinnamonum cassia*Blume.
23.	Sanvhalu (Fruit)	*Vitexnegundo* Linn.
24.	Sazaj Hindi (Stem bark)	*Cinnamonumtamala*Buch. Ham.
25.	Talmakhana (Seed)	*Asteracanthalongifolia*Nees.

B. Dr. Md. Muslim Uddin		
MONOGRAPHS OF SINGLE DRUGS		
Sl. No.	***Unani Name***	***Botanical Name***
01.	Aam (Stem bark)	*Mangiferaindica*Linn
02.	Aamla(Fruits)	*Phyllanthusemblica*Gaertn
03.	Arjun(Stem bark)	*Terminaliaarjuna*
04.	Asgand(Roots)	*Witheniasomnifera*
05.	Aslussus(Stolon and root)	*Glycirrhizaglabra* Linn
06.	Babchi (Rfuits)	*Psoraleacorylifolia* Linn
07.	Badiyan(Fruits)	*Foeniculumvulgare* Mill
08.	Balela(Fruits)	*Terminaliabellerica* Roxb
09.	Bedanjeer(Seeds)	*Ricinuscommunis* Linn
10.	Belgiri(Fruits)	*Aeglemarmelos*
11.	Bhangra(Whole plant)	*Eclipta alba*Hassk
12.	Chiraita(Whole plant)	*SwertiachirataBuch*
13.	Chirchita(Root)	*Achyranthesaspera* Linn
14.	Doob(Root)	*Cynodondectylon*
15.	FilfilSiyah(Fruit)	*Piper nigrum* Linn
16.	Fufal(Seeds)	*Areca catechu Linn*
17.	Gilo(Leaves)	*Tinosporacordifolia*
18.	HabbusSalatin(Seeds)	*Croton tiglium*
19.	JalBrahmi(Whole plant)	*Bacopomoniera*linn
20.	Jamun(Stem Bark)	*Syzygiumcumini* Linn
21.	Jamun(Seeds)	*Syzygiumcumini* Linn
22.	Karanja(Root)	*Pongamiapinnata* Linn
23.	Karela(Fresh fruit)	*Momordicacharantia* Linn
24.	Katan(Seeds)	*Linumusitatissimum*
25.	Kishneez(Seeds)	*Coriandrumsativum* Linn
26.	Kutki (Rhizome)	Picrorhizakurrooa
27.	Mader(Stem bark)	*Calotropisprocera*
28.	Mako(Whole plant)	*Solanumnigrum* Linn
29.	Narmusk(Stamens)	*Mesuaferrea* Linn
30.	Neelofer(Flowers)	*Nymphaenouchali* Burn
31.	Neem(Stem bark)	*Azadirachtaindica*
32.	Neem(Leaf)	*Azadirachtaindica*
33.	Sana(Leaves)	*Cassia angustifolia*
34.	Sazaj Hindi(Leaves)	*Cinnamomumtamala*Nees
35.	Sheetraj(Root)	*Plumbagozeylanica* Linn
36.	Sibr(Leaves)	*Aloe barbedinsis* Mill
37.	Zanjabeel(Rhizome)	ZingiberofficinaleRosc.
38.	ZardChob(Rhizome)	*Curcuma longa* Linn
39.	ZeeraSiyah(Seeds)	*Carumcarvi* Linn

C . Dr. Mohammad Nazrul Islam		
MONOGRAPHS OF SINGLE DRUGS		
Sl. No.	**Unani Name**	**Botanical Name**
1.	Ajwainkhurasani (Seed)	*Hyoscyamusniger*
2.	Asrol (Root)	*Rauwolfiaserpentina*
3.	Karanjwa (Seed)	*Caesalpiniabonduc*
4.	Khayar(Seed)	*Cucumissativus*
5.	Nana (Leaf)	*Menthaarvensis*
6.	Neem (Bark)	*Azadirachtaindica*,
7.	Neem (Fruit)	*Azadirachtaindica*,
8.	Rehan (Leaf)	*Ocimumtenuiflorum*
9.	Sad kufi (Rhizome)	*Cyperusrotundus*
10.	Sambahalu(Leaf)	*Vitexnegundu* Linn
11.	Sarson(Seed)	*Brassica campestris Linn*
12.	Seer (Bulb)	*Allium sativum*
13.	Sehjana(Leaf)	*Moringaoleifera*
14.	Sembhal (Stem bark)	*Bombaxceiba*
15.	Tukhmekhatmi (Seed)	*Althaeaofficinalis*
16.	Abresham(Silk cocoon)	*Bombyxmori*
17.	Ajwain (Fruit)	*Trachycpermumammi*
18.	Anar (Fresh seed)	*Punicagranatum*
19.	Angoor(Fruit)	*Vitisvinifera*
20.	Arusa (Leaf)	*Adhatodavasica*
21.	Bisbasa(Aril)	*Myristicafragrans*
22.	Jao(Fruit)	*Hordeumvulgare*
23.	Maghzetukhmekaddushireen(Kernel)	*Cucurbitamoschata*
24.	Mayeenkalan(Gall)	*Tamarixgallica*
25.	Oodhindi(Heart wood)	*Aquilariaagallocha*
26.	Palashpapra(Seed)	*Buteamonosperma*
27.	Raal (Resinous exudate)	*Shorearobusta*
28.	Reesh-e-bargad (Aerial root)	*Ficusbangalensis*
29.	Satawar(Tuberous root)	*Asparagus racemosus*
30.	Sahtara(Whole plant)	*Fumariaparviflora*
31.	Tamar hindi (Fruit pulp)	*Tamarindusindica* Linn
32.	Tambol (Leaf)	*Piper betle*
33.	Tukhmegajar (Seed)	*Daucuscarota*
34.	Tukhmekasni (Seed)	*Cichoriumintybus*
35.	Gurmur (Stem and leaf)	*Gymnemasylvestre*
36.	Chobchini(Tuberous root)	*Smilax china*

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